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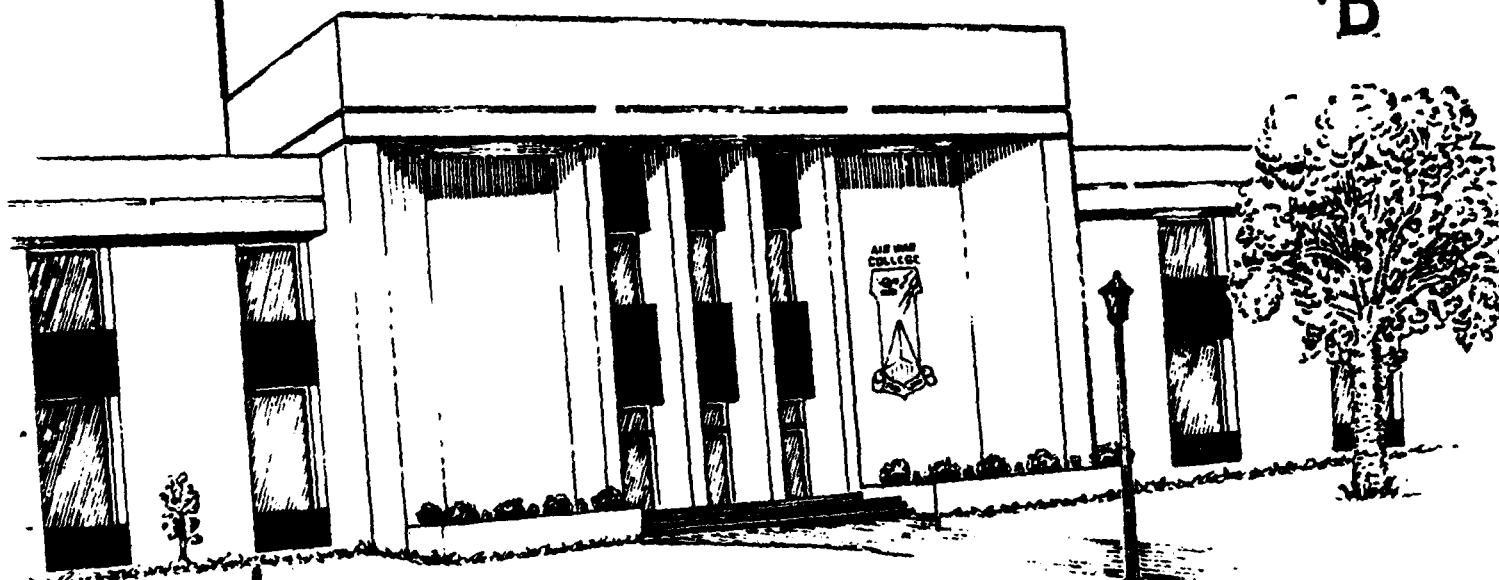
# AIR WAR COLLEGE

## RESEARCH REPORT

COMPUTER CONFERENCING: AN OPPORTUNITY FOR NEW  
DIRECTIONS

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MAXWELL AIR FORCE BASE, ALABAMA

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AIR WAR COLLEGE  
AIR UNIVERSITY

COMPUTER CONFERENCING:  
AN OPPORTUNITY FOR NEW DIRECTIONS

by

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A RESEARCH REPORT SUBMITTED TO THE FACULTY  
IN  
FULFILLMENT OF THE RESEARCH  
REQUIREMENT

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MAXWELL AIR FORCE BASE, ALABAMA

May 1988

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## AIR WAR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Computer Conferencing: An Opportunity for New Directions

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Remarks on the impact of one type of a computer-mediated communication system--computer conferencing--describe its fundamental advantage as increasing interaction among geographically separated, functionally aligned individuals. The effect is to fundamentally alter group dynamics and enhance existing decision-making mechanisms in large, complex organizations. Through an analysis of existing U.S. Army computer conferences, the author is able to broadly discuss possible positive impacts associated with instituting similar computer conferences in the Air Force.

## BIOGRAPHICAL SKETCH

Lieutenant Colonel Gerald C. Carpenter (B.S., United States Air Force Academy; M.A., University of Northern Colorado) has been active in computer conferencing since joining US ARMY FORUM in 1985. A command pilot, Colonel Carpenter has accumulated more than 2600 hours in tactical aircraft including the RF-4C, F-4E, and F-5E/F. Additionally, he was an Air Weapons Controller having served a remote tour as an Aircraft Control and Warning Operations Advisor to the Imperial Iranian Air Force. Colonel Carpenter has completed Squadron Officer's School and Air Command and Staff College by correspondence. He is a graduate of the Air War College, Class of 1988.

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## CHAPTER ONE

### INTRODUCTION

In the early 1950s when engineers at UNIVAC started experimenting with transmitting data between computers over ordinary telephone lines, only a small group of visionaries could possibly imagine the impact their efforts would eventually have on communications, social interaction, group dynamics, and decision-making.

#### Computer Conferencing-The Beginning

Early in 1970, political and economic pressures required President Nixon to impose a nationwide wage-price freeze. To successfully implement and conduct such a program, the administration faced a major problem: How was it to exchange all the necessary information--guidelines, judgments, official statements, and policy clarifications--with the regional offices of the Office of Emergency Preparedness (OEP) in a timely manner in order to properly enforce the freeze?

The vast amount of information that had to be passed to and through OEP required a new application of existing computer/telecommunications technology--an electronic network connecting OEP regional offices to allow the administration to update policy and be responsive to requests or questions. What emerged was the equivalent of a computerized telephone conference call, yet one that was free of the constraints of geographic location or time differences. (14:46-63) Obviously, this was all done with the financial sponsorship of the United

States government and some of the nation's most sophisticated computer technology. But, one could ask, what levels of this technology were easily accessible to the individual?

### Individual Access to Sophisticated Technology

The preliminary work at UNIVAC, intended primarily for data transmission between large, mainframe computers, would take on a new and greater significance in 1970 with production of the first microcomputer by Intel Corporation; however, widespread individual access to relatively sophisticated computer technology was extremely limited because of high costs.

In 1970, the author purchased a hand calculator for just over \$100.00. At the time, the price seemed reasonable considering it was capable of performing all the basic arithmetic functions--addition, subtraction, multiplication, and division. Ten years later the cost of a basic, yet very useful *microcomputer* had brought computer technology well within the reach of most middle-class families. A good example was the author's Sinclair ZX-81, which retailed for \$99.00--less than what the hand calculator cost a decade earlier. Since 1980, the number of available and affordable microcomputer systems has increased exponentially giving individuals the ability to easily manipulate, analyze, store and transmit large, complex data arrays.

Today, computer-mediated communication systems, like that first introduced by the OEP in 1970, are integral elements of organizational structures and are becoming part of the daily routine for millions of

computer operators, enthusiasts, and corporate executives. In part, this can be traced to the low cost of both sophisticated hardware and software as well as the expansion of international telephone systems which make coast-to-coast and worldwide communications common place.

### The Mystique of Computer Technology

It is the author's opinion that the general populace has become preoccupied with specific hardware and personal software applications rather than explore more innovative applications the technology provides. This is primarily due to an aura of mystique which has always surrounded computer applications and, more specifically, computer communications technology.

The most difficult facet [sic] of the computer industry to completely understand is that of communications. Computer folks are intimidated by the technical jargon and complex terminology that best suits this segment. Luckily, however, accessing an on-line information service, transferring a file, downloading information from a host [computer], and swapping mail with far-away friends does not require a highly technical communications background. As a matter of fact, any of the aforementioned tasks can be performed successfully by almost anybody with a basic understanding of communications hardware and software. (34:601)

### Purpose of Research Paper

This research paper will attempt to shred away this mystique and present the reader with an appreciation for the potential of this technology. It will take an in-depth look at one type of a computer-mediated

communication system, *computer conferencing*, and will answer the question "What is computer conferencing?" It will analyze the advantages of computer conferencing and postulate on specific applications for the Air Force.

### Hypothesis

Computer conferencing is a low-cost application of technology which has proven its capability to unleash the synergistic potential of individuals with like areas of interest. The author's opinion is that in a time of renewed budget constraints, computer conferencing can help eliminate many overhead costs of on-going group discussions, education and training programs, and ultimately enhance established decision-making mechanisms. Above all, however, *computer conferencing* can provide the Air Force with *an opportunity for new directions* in its effort to enhance mission effectiveness and achieve stated goals.

## CHAPTER TWO

# TELECOMMUNICATIONS

The purpose of this chapter is to begin to shred away the mystique surrounding telecommunications technology as a first step in achieving an appreciation for the potential of computer conferencing. Much has been expressed about the need for *computer literacy*. An effective systems operator, manager, or company executive does not have to be able to design software or create programs; instead, each only needs to have a basic understanding of system design, operations, and computer applications. This elemental information tends to eliminate apprehension about what many perceive as complex and perplexing operations. Often these unfounded fears preclude innovative uses of this technology which would better serve their purposes.

Telecommunications is "the combined use of communications facilities, such as telephone systems and data processing equipment." (25:6-11, 199:16:80) Because the ability to transfer data between computers forms the foundation of computer-mediated communication systems, an individual must first attain a understanding of telecommunications fundamentals to creatively apply computer conferencing techniques.

### Data Transfer

Data can be transmitted in either analog or digital form. Although it could consist of several types--coaxial cable, microwave or satellite transmission--the most common and widely used communication channel for

the microcomputer owner, telephone lines, was originally designed to transfer voice communications, a form of analog transmission. *Analog transmissions* are synonymous with continuous waves, or tones, through a specific path created by the communication channel. *Digital transmissions* differ from analog in that they are processed in distinct *on* or *off* states, or pulses. (25:200;16:80) Because most computers process digital data, transfer of data over telephone lines require the capability to change the computer's digital data to analog data for transmission (modulation), then back again to digital data for processing by the receiving computer (demodulation).

#### MODEM

The device that accomplishes this conversion is known as a MODEM (*MOD*ulator-*DE*MODulator). Generally, microcomputers use one of three types of MODEMs for data transmissions: 1) an *internal MODEM* is an integral part of the computer and is connected directly into a telephone outlet; 2) a *direct-connect MODEM* is a separate device connected to the computer by cable and then to the telephone outlet by a normal telephone line; and, 3) an *acoustic coupler MODEM* is also a separate device connected to the computer by cable, but uses the telephone handset placed in two sound absorbent cups to make the telephone connection. (25:201;16:82) The main disadvantage with the acoustic coupler MODEM is the higher levels of noise than the other two types, thereby decreasing the reliability of the data transmission. In any case, each MODEM changes digital computer data to analog data, and back again.

There are three other characteristics associated with MODEMs which often add to the confusion of the new user: *synchronization*, *mode*, and *speed of transmission*.

Synchronization of transmission. Data transmissions can be either *asynchronous* or *synchronous*. Asynchronous transmissions are transmitted one character at a time with a time delay between the characters. Each is preceded by a specific *binary digit* (bit), a *start bit*, and ended with one or two *stop bits*, thereby allowing the receiving system to recognize separate characters. Additionally, there is an optional *parity bit* (odd or even) which forms the basis for an elementary error detection and correction method known as *parity checking*. (35:115) Synchronous transmissions, on the other hand, occur in a continuous stream. They also contain start and stop bits, but are controlled by a timing signal determined by the sending unit. The main advantage with synchronous transmissions is the large amount of data that can be sent in a short time; however, the biggest drawback is its high cost when compared to asynchronous devices. (35:115-116)

Mode of Transmission. There are three basic modes of transmission. A *simplex*, or one-way, transmission means a MODEM which can either send or receive data, but not both. *Half-duplex* transmissions are those in which the MODEM can both transmit and receive data, but only one mode at a time. *Full-duplex* transmissions enable the MODEM to transmit and receive data simultaneously. Most MODEMs used by today's microcomputer owner are capable of either half- or full-duplex operation. (25:201;16:82)

Speed of Transmission. To learn more about the speed at which a MODEM transmits data, it is important to remember the smallest element in computer storage capability is the single binary digit--a bit. The number of ". . . discrete conditions or signal events transmitted per second" is defined as *baud*. (36:603) The most common rates for today's personal computer systems are 300-, 1200- and, most recently, 2400-bits per second (bps). At these rates, baud and bits per second are nearly the same; therefore, they are often used interchangeably. It is only at rates above 2400-bps that a significant difference begins to appear. For the purposes of this paper, baud and bps will be equivalent.

Because telephone lines were designed for low-fidelity, voice transmissions, rates in excess of 300-bps can present problems. This is attributable to the natural noise in the line or transmission rates that require much higher fidelity. One cure for this phenomenon is more capable telephone lines, possibly fiber optic cables. Additionally, manufacturers have designed error detection capability into MODEM software. The new user should be aware that such exotic names as *XMODEM*, *cyclic redundancy checking (CRC)*, *Kermit*, etc., are just a few of the transmission designs that include error detection and correction protocols in communications software.

Now that the reader has a basic understanding of how computers communicate, the question is: "What equipment is needed to allow an individual access to a computer-mediated communication system?"

## The Microcomputer

First, there is the personal computer (PC), or microcomputer. The components of the PC include the *system unit*, *input device(s)*, *output device(s)*, and *storage device(s)*. As an aside, those devices which are connected to the computer and provide input or output capability are called *peripherals*.

System Unit. The system unit consists of the *central processing unit (CPU)*, *memory*, and *disk drive device(s)*. The CPU is the brain of the PC. It is the circuitry that processes information and carries out instructions. Memory is generally categorized into permanent and temporary. The inalterable portion, or ROM (*Read Only Memory*), is where critical system data and instructions remain, even after power is removed. RAM (*Random Access Memory*) is stored while the computer is running. This working memory is erased once power is interrupted or removed from the system. Computer memory is measured in blocks of 1024 characters (bit), or *bytes*, often called a "K." The disk drive device transfers, or writes, data to and reads data from a disk. Each disk drive device is given a designator, such as "A: drive."

Input Device(s). Input devices are used by the operator to communicate with the computer and direct its operation. The most commonly used input device is the *keyboard*. Others include joy-sticks, a mouse, optical character recognition (OCR) readers, light pens, or touch sensitive screens, which were made popular by the Hewlett-Packard PC.

Output Device(s). The most commonly used output devices are the *monitor* and *printer*. Monitors can be either monochrome, color or RGB (red-green-blue). In less expensive systems, a normal television could also be used as a monitor. Most printers are either dot-matrix, daisy wheel (letter quality) or laser. More sophisticated operators, especially those employing computer-aided design (CAD) applications, may also use a *plotter* as an output device.

Storage Device(s). Storage devices are either internal or external. The most common storage device is a *magnetic disk*, either a large capacity hard disk (commonly called a Winchester disk) which is normally internal in the system unit or a smaller, more limited capacity flexible, or "floppy," disk. Floppy disks normally used in PCs are 5 1/4-, 8- and, most recently, 3 1/2-inch disks. Other less expensive systems may use the more common cassette tape to store data.

#### Additional Peripherals

MODEM. A MODEM is used to communicate with other computers, and was described earlier. One MODEM must initiate the call and the other must receive it. Obviously, two individuals with *originate-only* or *answer-only* MODEMs cannot communicate with each other.

Standby Power Systems. These systems provide emergency backup power in case of electrical failure or interruption. As described earlier, RAM is volatile; that is, data being stored or manipulated can become lost or erased when system power is eliminated. A standby power system will normally activate very rapidly to preclude any loss of data.

Additionally, like smaller, less expensive surge protectors, they protect sensitive micro-circuitry from power surges, line noise, interference, and overvoltage.

Tape Backup Units. These devices provide backup storage for data stored in files. Normally, an operator will backup any valuable data, especially that stored on large capacity hard drives. If some malfunction would cause the information to be lost, the backup unit could restore not only the data, but the organization of the disk as well.

All the preceding devices, including their associated connecting cables, are generally described as the *system's hardware*. But the computer must have instructions to allow the hardware to function properly.

### Software

The *systems software* that provides basic operations and controls a disk-based system is the *Disk Operating System (DOS)*. The most common types of DOS are CP/M (Control Program for Microcomputers), Z-DOS (Zenith Data Systems DOS), MS-DOS (MicroSoft DOS) and PC-DOS (IBM Personal Computer DOS). The procedure of initially loading the DOS into the unit's RAM is called "*booting*," or starting the system.

Many types of *applications software* are available based on the needs of the user, i.e., word processing, data base management, financial modeling, accounting spreadsheets, education and training programs, entertainment, etc. As an example, to transfer data between computers, the system must use a communications software program which sets the

MODEM's communication protocols, such as the mode of transmission, baud, and error detection and correction, and allows the operator to send and receive data with ease.

### A Telecommunications Session

Throughout this paper, examples of actual telecommunications sessions will be displayed for the reader's clarification and are presented as they would actually appear on a scrolling monitor. Appendix A represents one of the more common uses for telecommunications--accessing a public data base. In this case, the Air University (AU) Library catalog system was queried for references on *"teleconferencing."* The communications software used for the session was *PROCOMM*, developed by DataStorm Technologies, Inc. of Columbia, MD. User inputs are designated by emphasized italic print, normally followed by a "<cr>," the designation for "enter" (or *carriage return*). Each user input is preceeded by the symbol --> to allow the reader to quickly locate them.

This type of telecommunications session is very typical of the kinds of data available to the computer operator and is an good example of the ease with which the information can be obtained.

### The Medium

Telecommunications technology has introduced us to a revolutionary method of social interaction--*computer-mediated communications*. Yet the potential user of a computer-mediated communication system should realize there is nothing magical or mystical about how it functions. By

working through its mystique, the new user will eventually begin to explore and realize the enormous potential of computer-mediated communication systems.

The medium has unquestionable benefits. Along with advantages, however, computer-mediated communications introduces unique dynamics and problems. Chapter Three will begin to explore this medium in more detail.

### CHAPTER THREE

## COMPUTER-MEDIATED COMMUNICATION SYSTEMS

Computer-mediated communication systems ". . . structure, store, and process communications" using computers. (21:2) As such, they provide new formats for human communication and have the potential for shaping and sustaining human relationships.

The use of computer bulletin boards, electronic mail, long-distance blackboards, instantaneously transferable data banks, and computer conferences is transforming today's workplace as well as the very nature of work itself. (22:1123:41:130)

*In Montgomery County, Pennsylvania, lawyers are discovering [computer-mediated communication systems] can make their jobs much easier.*

Montgomery County is proud of its computerized system for keeping track of court business. The system is one of the most advanced of any county government in the country. A Honeywell mainframe computer is responsible for keeping almost all court records on-line. Dial-up communication lines make calling the courthouse and checking on the status of cases easy for lawyers. Up-to-the-minute information is available on the filing of lawsuits, scheduling of cases, recording of judgments, collecting of alimony and child support, and selecting of juries. *Attorneys simply dial the courthouse whenever they need current information.* [Italics added]

The system has proven so successful that in one month it received over 8,500 calls for information . . . . Connections to the courthouse network can be made via personal computers, regular terminals, or communicating word processors. (25:208)

Many major government agencies, private firms, and corporations use computer-mediated communication for routine data transfer, memos, official communication, simultaneous editing of written documents, development of agendas, and *teleconferencing*--". . . an electronic gathering of three or more individuals at two or more locations."

(14:1) Others have begun more nontraditional methods of conducting business, such as *telecommuting*, which gives employees the opportunity to do many information processing tasks from their homes and avoid the daily commute to and from their normal workplace. (22:1123;6:127-135)

Computer-mediated communication systems can offer many advantages: improved morale; increased productivity; time savings; and, the ability to increase a group's knowledge by reaching a large number of geographically separated individuals. (5:150) In fact, starting in the late 1970s, many authors shared the opinion that computers would have a tremendous impact in the business environment.

During the next 50 years computer based message systems (CBMS's) will have as great an impact on the way business is done in our society as the impact that the telephone has on business systems during the last 100 years. (15:739)

This chapter will look briefly at two of these systems: *computer bulletin boards* and *electronic mail*.

### Computer Bulletin Boards

The large and rapid growth in the personal use of microcomputers has resulted in the development of computer bulletin boards--telephone-linked networks among users which are designed to exchange a wide range of information.

Bulletin boards were initially developed and operated by computer enthusiasts who owned a particular computer system. Typically, the members would share information and trouble-shoot problems associated with these systems. Additionally, the bulletin board gave the participants the capability to share compatible, public-domain (non-copyright) software. Gradually, more innovative uses of this technology were recognized and bulletin boards evolved based on common interests among a large number of computer owners. These included medical information, software languages, application software, genealogical research, engineering interests, hobbies, war-gaming, etc. Most bulletin board systems (BBS) are menu-driven; that is, the system's software continually offers options to route the user through its functions: bulletins, messages, and file transfer. (37:101)

**Bulletins.** Text files intended to be read by users upon initial access to the BBS are called bulletins. (37:102) Many systems, in fact, may be limited to only providing bulletins for its users. These are normally originated by the system operator, or *sysop*.

**Messages.** Basic message capability is built into most bulletin board systems. Upon entering the system, the user is told whether they have any messages stored for them. If there are any, the user can then

direct the system to display them. (37:102) Messages can be directed to specific people, thus providing a simple means of security, or they can be made available to all the participants allowed access to the BBS. This method of sending messages often forms a elementary type of on-going discussion among members.

**File Transfer.** As mentioned earlier, users can use the BBS to upload (transfer to the BBS) or download (transfer from the BBS) files, normally public domain software. It is especially helpful if the sysop categorizes the general types of available software. This allows the user to go directly to a general area of interest and upload/download specific files rather than searching through the entire listing of software obtainable on the BBS.

**BBS Regulation.** As the myriad of bulletin board systems have evolved, many issues have been raised because their operations have been virtually unregulated. One major concern is whether the system operator is legally responsible for the activities on a BBS. One specific example could be the transfer of copyrighted, but not copy-protected software. Others may include divulging sensitive or private information, dissemination of obscene material, or purposely uploading software containing a "trojan horse"--a program designed to destroy the contents of an owner's disks or application software after several uses. These issues raise basic constitutional dilemmas which are presently unresolved. As the technology spreads and computer-mediated communication systems gain wider acceptance, these questions will be addressed in the courts.

BBS Session. Appendix B illustrates a sample session on a microcomputer bulletin board system, in this case the Heath Users' Group (HUG) BBS in Benton Harbor, MI. Again, most systems are menu-driven; therefore, steps to gain access to information on the BBS is very simple and straightforward.

Because of their low-cost, flexibility, and ease of operation, even a basic BBS can positively impact an organization if used in an innovative way.

### Electronic Mail

Electronic mail, or *E-mail*, is a second form of computer-mediated communication systems. It is a form of two-way communication which allows people to send an electronic message file, or mail, to others 24 hours a day. An electronic mail system is much more sophisticated than the BBS's basic message capability and provides the user with more rapid means of information dissemination than more conventional methods such as copying, mail, and the telephone.

Once created, a message is directed to a person or group via an electronic transfer system that recognizes a specific mailbox identifier and is then stored for retrieval at the convenience of the addressee.

An advantage of electronic mail is it can eliminate the phenomenon known as "telephone tag." This occurs when one individual calls another only to find out that person is out of the office. Upon receiving the message from the first call, the second person then phones back to dis-

cover the original caller is unavailable; so, another message is left. In the very least, these types of delays are frustrating; at other times, they can prove to be very costly.

A 1979 study by Bell-Northern Research, Inc., suggested an electronic messaging system provided significant advantages over an office without a like system.

The percentage of attempts to contact fellow workers that failed (for example, from busy phone lines) decreased. Reductions in such shadow functions carry measurable cost-benefit implications. In this case, [the time savings resulted] from improvements in the communications process alone. In most cases, these time savings appeared to have been reinvested in producing more or better work . . . [Additionally, peoples'] attitude toward technology and its potential benefits became more positive with system use. (41:137-138)

The study's final assessment indicated most office workers wanted the system expanded. Among the functions the users most wanted to see were ". . . automatic project accounting, computer conferencing, and memo and letter templates." (41:138)

Although electronic mail ". . . satisfies the need to move messages . . . according to certain priorities and certain distribution structures . . . it does not provide a *shared communications space to a specific group of people working on a specific task.*" [italics added] (44:70) That is the goal reserved for a third type of computer-mediated communication system--*computer conferencing.*

## CHAPTER FOUR

### COMPUTER CONFERENCING

A 1987 Air University case study asserted "the challenge for the large [hierarchical] bureaucracy . . . is to accommodate, even stimulate, innovative thinking that can result in the desired productivity and efficiency." (20:1) By providing a forum for an open and honest exchange of information and ideas, computer conferencing has become an effective and unique method for increasing the productivity of people and their organizations by literally unleashing the synergistic potential of individuals geographically and time separated.

Organizations are continuously looking outside their structure for missing information or expertise, when, in many cases, it already exists in the combined experience and knowledge of their own personnel. The real problem is how to tap, capture, and manage information from this resource base in an effective and productive way. (23:36)

Like other computer-mediated communication systems, computer conferencing uses computers ". . . to structure, store, and process written communications among a group of persons." (14:7) An important distinction, however, must be made between bulletin board systems, electronic mail, and computer conferencing. The first two have been described as utilities; on the other hand, computer conferencing is an *environment* in which people interact. (1:41)

The principle characteristic of this environment conference is the *networking of a talent bank of informed people*. John Naisbitt, in his best selling book Megatrends, stated the trend toward networking resulted from repeated failures of more traditional hierarchies to solve problems. (27:191) He clearly describes the benefits derived from networking.

Although sharing information and contacts is their main purpose, networks can go beyond the mere transfer of data and the creation and exchange of knowledge. As each person in a network takes in new information, he or she synthesizes it and comes up with other, new ideas. Networks share these newly forged thoughts and ideas. (27:194)

From this discussion, one can better understand the potential of computer conferencing: *it is a synergistic process that integrates ideas*.

This chapter will explore this final example of computer-mediated communication system.

### What Is Computer Conferencing?

Computer conferencing provides the opportunity for many-to-many *discussion* by building on the modest "store-and-forward" design of other computer-mediated communication systems. A central computer uses a conferencing system to organize discussion items and comments, and then present them to participants on request. Furthermore, the system notifies the user of any new dialogue, provides the means to search

through previous discussions, and can retrieve any desired information. This last characteristic is possible because conferencing systems maintain a continuous archive of the conference proceedings.

It is hard to describe the concept of computer conferencing to anyone who has very little, if any, hands-on experience with computers and associated communications technology. Because its main advantage lies in on-going, group discussions over prolonged periods, frequent conferencing participants point out the difficulty in demonstrating the immense utility of this technology. (2) Dr. Robert Parnes, designer of CONFER II\*, offers an exercise to help visualize the dynamics of a computer conferencing system.

I ask them to imagine they're part of a group of 26 people . . . [then] imagine they have a topic they'd like the other 25 people to talk about. They are to imagine how they'd use the phone or the mail to get [all] the initial ideas . . . then to imagine how they'd get the reactions of the [others] to [these] initial ideas. I then ask them to imagine how they'd go about using the phone or mail to get the [other] 25 people to share their initial reactions with each other. Byt [sic] this time most people have some difficulty in constructing an image. Then I go on to ask them to imagine how they'd share their reactions to the initial reactions among the entire group. Of course, it's impossible using the phone or mail, so it never

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\*CONFER II is a computer conferencing system designed by Dr. Robert Parnes and is a registered trademark of Advertel Communication Systems, Inc. of Ann Arbor, Michigan.

gets done. Those technologies simply don't support true group exchanges . . . most people don't have any experience being part of such groups and can't imagine what it would be like to be part of one.

(32)

To form a basic frame of reference, it is necessary to compare various communication methods. Starr Roxanne Hiltz and Murray Turoff, in The Network Nation, depict a "comparative framework" of communication systems. They state that differences among these systems ". . . directly influence their impact on human behavior." (14:32)

Communication Systems Comparison. Table 4.1, extracted from Hiltz and Turoff's book, is a useful summary of what they describe as ". . . the principal physical parameters that characterize the differences among these . . . systems." (14:39)

Table 4.1  
Summary Comparison Table

Medium				
Oral		Written		
Single structures		Telephone Video (TV)	Electronic mail	Mail, telegrams, TWX, etc.
Varied structures	Face-to-Face	CB radio	Computerized conferencing	Delphi
Control	Group	Group	Individual	Individual
Speed	Talking rate	Talking rate	Reading rate	Reading rate
Time coincidence	Necessary	Necessary	Not necessary	Not necessary
Geographical coincidence	Necessary	Not necessary	Not necessary	Not necessary
System delays	None	None	Some	Considerable
Memory	Separate	Separate	Integral	Separate

(14:39)

Table 4-2 further describes ". . . specific physical parameters that appear to be the fundamental measures of the communication process." (14:32) Hiltz and Turoff compare eight communication systems; however, for the purposes of this paper, this data is limited to three: *face-to-face meetings, telephone conversations, and computer conferencing*. Again, this comparison will provide the reader with a frame of reference with which to initially assess the capabilities and potential of computer conferencing.

Table 4-2  
A Communications System Morphology

System parameter	System type		
	Face-to-face	Telephone	Computer Conferencing
Medium of transfer	Verbal and nonverbal	Verbal	Written word, graphics
Effective group size limit	Free discussion: Few tens Structured: Hundreds	Free discussion: Few tens Structured: Few tens	Free discussion: Many tens Structured: To thousands
Occurrence of interaction	Coincidence of all	Coincidence of all	Individual choice
Length of interaction	Minutes to hours	Minutes to hours	Minutes to hours
Frequency of interaction	Predetermined	Predetermined and chance	Individual choice
Speed of interaction limit	Talking rate	Talking rate	Reading speed
System delays	None	None	None
System memory	Recordings	Recordings	Electronic
Memory modification	None	None	Unlimited
Memory retrieval	None	None	Unlimited
Memory size	Original	Original	Unlimited
Transformations	Transcription	Transcription	Hard copy
Structure	Varied but fixed	Single and fixed	Dynamic and adaptable
Skills	Speaking ability and mannerisms	Speaking ability	Writing ability and typing

(14:34-35)

Structure of a Computer Conference. If the computer conferencing system must have the capability to act as the broker of information (structure, store, and process), there must be some formal structure to

that system in order to build an effective, interactive environment. As an example, Table 4.3 outlines the basic structural elements used by Ad-vertel Communication Systems' CONFER II.

Table 4.3  
The CONFER II Environment

Structure	Description
<i>Conference</i>	The basic social structure. A group of people discussing topics of mutual interest over an extended period of time.
<i>Item</i>	Major topics of discussion. Entered by a participant and includes the initial text and ensuing <i>responses</i> . Become a permanent part of the proceedings and are visible to anyone who is a member of the conference.
<i>Response</i>	A short reaction to an <i>item</i> . Every participant is free to respond, and every <i>response</i> is immediately visible to all members of the conference.
<i>Message</i>	A private communication to another participant.
<i>Bulletin</i>	A short announcement which is automatically shown once to every participant. <i>Bulletins</i> usually announce important events, but they are also useful for drawing attention to a particular <i>item</i> or problem.
<i>Note</i>	A reminder to yourself which will automatically be shown at a designated time.
<i>Meeting</i>	A place where small groups can conduct conversations in real-time or over an extended period.

(31:2-3;26:183)

Although private messages between individuals may influence inputs, public discussion is built on participants' *items* and *responses*. This *item-response* structure is portrayed in Figure 4.4, "Conference Structure."

From this, one can then visualize the capability for *infinite growth* within a conference. This is portrayed in Figure 4.5, "How a Conference Grows."

Figure 4.4  
CONFERENCE STRUCTURE

ITEM 1 -	_____
RESPONSE 1 -	_____
RESPONSE 2 -	_____
ITEM 2 -	_____
RESPONSE 1 -	_____
ITEM 3 -	_____

(7)

Figure 4.5  
HOW A CONFERENCE GROWS

<u>ITEM 1</u>	<u>ITEM 2</u>	<u>ITEM 3</u>	<u>ITEM 4</u>	<u>ITEM 5</u>	xx>
RESPONSE 1	RESPONSE 1	RESPONSE 1	RESPONSE 1	RESPONSE 1	
RESPONSE 2	RESPONSE 2	RESPONSE 2	RESPONSE 2	RESPONSE 2	
RESPONSE 3	RESPONSE 3	RESPONSE 3	RESPONSE 3	RESPONSE 3	
RESPONSE 4	RESPONSE 4	RESPONSE 4	_____	RESPONSE 4	
_____	RESPONSE 5	_____	_____	_____	
_____	_____	_____	_____	_____	
↓	↓	↓	↓	↓	

(17)

Types of Computer Conferences. Researchers, participants, and system designers have identified several general categories of computer conferences. The appropriate type is normally dependent on the conference's overall goal(s).

Mr. Bill Paul of Exxon Corporation categorizes conferences into five general types: *contribution, communication, coordination, cooperation, and collaboration*. (33) More specifically, Dr. Robert Parnes describes eight types of CONFER II conferences where the variables are *membership, duration, and agenda*:

- o *Task force* - well-defined membership, fixed duration, and focused agenda.
- o *Committee* - well-defined membership, indefinite duration, and focused agenda.
- o *Commission* - well-defined membership, fixed duration, and full-scope agenda.
- o *Congress* - well-defined membership, indefinite duration, and full-scope agenda.
- o *Workshop* - ill-defined membership, fixed duration, and focused agenda.
- o *Special Interest Group* - ill-defined membership, indefinite duration, and focused agenda.
- o *Assembly* - ill defined membership, fixed duration, and full-scope agenda.
- o *General Interest Group* - ill-defined membership, indefinite duration, and full-scope agenda.

(33:50)

Most authors agree that modes of participation are primary determinants for helping the conference focus on its purpose. As a technique, the conference organizer may use one of the following modes:

- o *Open/Public* - generally unlimited; membership is open to anyone with access to the system.
- o *Closed/Private* - generally limited; membership is determined by the organizer.
- o *Restricted* - Open to one group and closed to another.
- o *Protected* - a closed conference; its very existence is hidden from people with access to the system.

(31:12;26:173;29:196)

### Why Computer Conferencing?

Computer conferences link people with similar interests and subject expertise in order to exchange information and solve problems. Participants in a computer conference contribute to the proceedings at their convenience; although the capability exists, there is no requirement for simultaneous, or real-time, discussion. Overall, this flexibility enhances the quality of discussion because participants can pause and reflect prior to composing a reply rather than be pressured into responding as often happens in real-time exchanges, such as face-to-face meetings or audio (telephone) conferences. Through this *process*, computer conferencing can complement and enhance existing decision-making mechanisms. Additionally, the communications technology that allows this process to occur, allows it to occur in a timely manner without regard to geographic location or time and, normally, in greater breadth and depth.

It should be obvious from previous discussions, there are distinct advantages associated with various communication systems. Most people are familiar with more traditional methods; however, computer conferencing has its own unique advantages that may not be as apparent.

Benefits of Computer Conferencing. Computer conferences can:

- o Provide new communication opportunities that support group interaction. There is no need to coordinate the schedules of those involved in the discussion although they may be geographically separated. This allows more timely interaction and improved group decisions. Participants can experience rapid and multiple feedback to an idea, and can give and receive feedback on the feedback 24-hours a day.
- o Provide for cross-fertilization of ideas. People with like interests meet and fully discuss shared points of view. Participants can discuss multiple topics with all members of the group and simultaneously conduct private conversations with no interference among these exchanges. Additionally, an organized written record of the public discussion is always available for review.
- o Increase quality of work. With more time for reflection, participants can collect and compose their thoughts before they contribute. They are then able to contribute at a time convenient for them. Additionally, written communications are normally less verbose than verbal ones when attempting to solve problems.

- o Insure equality of participation. Every participant can fully contribute without reducing others' contributions. It is non-interruptive and reduces the likelihood that a conversation would be dominated by an individual due to personality or position.
- o Reduce communication problems associated with a hierarchical bureaucracy. By allowing information sharing across organizational boundaries, it achieves simultaneous horizontal and vertical staffing.
- o Reduce travel requirements. People do not need to travel to a single location to participate in the discussion. As a spin-off, therefore, an individual or organization could realize significant savings on both travel time and expense.
- o Reduce the likelihood of agenda items being dropped because of time constraints.
- o Enhance the candor of opinions.

(23:36-37;14:8-9;31:2;21:112-133;30:7;3:4;19:10,81-84,148,150,217;39:8)

Uses for Computer Conferencing. From these benefits, one can derive a number of possible uses:

- o Crisis management--providing the capability to coalesce experts from within and outside an organization in the shortest possible time. Conferencing provides the opportunity for talent banking--maintaining an up-to-date register of individuals and their field(s) of expertise.

- o Resolution of complex problems. The breadth and depth of discussions among a large number of participants aid in brain storming, analyzing possible solutions, and decision making.
- o Project management--allowing for review and recording of all modifications, suggestions, and changes.
- o Budgeting--allowing requests to be managed at lower organizational levels through timely discussion and feedback.
- o Replacing or supplementing costly and difficult-to-arrange face-to-face meetings or telephone conference calls.
- o Replacing or supplementing other forms of communication used to raise issues, set agendas, and follow-up face-to-face meetings.
- o Assisting management to coordinate and direct geographically-dispersed organizations.
- o Providing a medium for on-going discussion among people who are too busy or dispersed to otherwise be in contact.
- o Easily, quickly, and inexpensively distributing information to a large group.
- o Providing a greater sense of community with people--even those geographically widely dispersed, or in different career fields and institutions.
- o Tailoring of the communications process to meet a group's particular characteristics, project goals, and types of participants.

- o Supplementing or replacing educational curriculum with electronic seminars.
- o Enhancing communication for the handicapped, deaf, and homebound persons.

(26:173-175;30:6;3:5-9;18:10,148,221;39:30-31;19:8)

### Computer Conferencing-Concerns

Although computer conferencing holds great potential, many researchers have recognized possible weaknesses stemming from ". . . the broad range of social implications. . ." involved in the use of this technology. (22:1132) Most of the social-psychological aspects associated with this technology have been addressed by designers of conferencing systems and conference organizers. Like other variables, concerns will differ depending on the specific goal of the conference: i.e., a more structured conference--one with a focused agenda--will have different requirements than one with a full-scope agenda.

Concerns. A number of concerns are listed below:

- o Although computer conferencing provides the opportunity for more equal participation, it requires effective leadership to assure discussions remain focused.
- o Although a permanent written record is available for review, some people may be reluctant to participate because their comments will become a permanent part of the conference's archive. This is likely to be more of a factor for the corporate executive than for a salesman, for example.

- o Although people may contribute at their convenience, it could be difficult to require them to participate. Along with this, there must be a recognized need to contribute; said another way, without a well-defined purpose and vested interest, many may not make the effort to participate.
- o A new participant to an established conference may be faced with a overwhelming amount of material to review before feeling comfortable discussing conference issues. This phenomenon has been described as information overload; in other cases, it could more accurately be described as "electronic junk."
- o Many people may limit their participation because of required technical skills; the most prevalent being the ability to type.
- o Fundamental changes to existing pattern(s) of information flow can perceived as threatening, especially to supervisors and executives. Conversely, centralized control may increase although the perception is one of increased decentralized participation and decision-making.
- o Unrealistic expectations based on the capability for rapid exchange of information.
- o Absence of normal social cues, such as non-verbal communication--eye contact, smiles, head nods, tone of voice--may weaken the effectiveness of communication. The

possibility of depersonalization may blind some to possibly offensive comments, which may limit the effectiveness of the discussion.

(14:76-123;18:203-204;19:8;22:1124-1125;8:163)

Why Conferences Fail. In The Network Nation, Hiltz and Turoff list several general reasons why computer conferences fail. These key points are taken verbatim from their text.

- o Lack of convenient access to a terminal.
- o Lack of a need or desire to communicate with other people on the system. This is related to a condition in which the group itself lacks a shared goal to which all members are willing to contribute several hours a week of their time.
- o Lack of adequate training material in an acceptable medium.
- o Lack of a "critical mass" within a conference or group. This has to do with a minimum number of active participants and a minimum number of geographic locations.
- o Lack of strong or adequate leadership.

(14:122-123)

### Facilitation

From the previous discussion, one can identify a key ingredient of a successful conference: the organizer must apply appropriate facilitation techniques. It is the organizer who defines the goals for the conference and is chartered to keep discussions on-track--providing the

process focus. In order to balance the preceding discussion, it is necessary to present some techniques for facilitating social interaction in a computer conference.

According to Dr. Robert Parnes, an organizer has three principal roles: *administrator, agenda keeper, and facilitator*. (33:6) He recognizes that *leadership* is also a vital role, but believes it may or may not be filled by the conference organizer--"Organizers can and frequently do provide leadership . . . however . . . the leadership of the conference may be assumed by other participants." (33:48) In The Organizer's Guide to CONFER II, Dr. Parnes lists several tasks for the facilitator:

- o Individually welcome participants to the conference.
- o Enter initial items, summary items, and bulletins in the conference.
- o Check on individual participation.
- o Boost morale of hesitant participants.
- o Help those participants who may feel intimidated by computers.
- o Suggest ways for participants to better their communication goals.
- o Take the initiative on entering items.
- o Assist with the use of the conferencing system.
- o Exercise leadership, with restraint, when appropriate.

(33:9)

More specifically, Ms. Mary George, the Chief of Support Services for the U.S. Army Decision Systems Management Agency (DSMA), has suggested several "principles of facilitation" for conference organizers of the U.S. Army-wide computer conference, US ARMY FORUM. She has categorized these principles into four general areas: *the purpose, operating norms and values, managing the process, and managing participation*. (9;10;11;12) Appendix C, the actual telecommunications transcript of her discussion, explains many ways a facilitator can minimize, if not overcome, the possible adverse social-psychological impacts of computer conferencing. The point is, however, they can be overcome with increasing familiarity with the technology.

#### Summary

William H. Landgraf, president of Systems Networks, summarizes:

[Computer conferencing] . . . makes possible an entirely new form of communication--relaxed but purposed and focused group discussions. . . . It is a means . . . for group discussions, group decision making and exchange of messages and information 24 hours a day, seven days a week, from anywhere in the world. This is accomplished without having all members physically co-located or working on identical time schedules. . . . [A] computer system maintains and updates both group discussions and private messages . . . at all times. (23:36)

In 1978, Hiltz and Turoff predicted computer conferencing ". . . will have dramatic psychological and social impacts on various group communications and processes." (14:xxix) They could not have been more

correct. The evolution of computer and communication technologies has effectively removed two limiting dimensions to group communication--time and distance.

Computer conferencing is innovative, yet practical; it is convenient, feasible, and economical; and, it can make a significant impact on the creativity, productivity, and dynamics of an organization. Why, then, has there been a reluctance by many individuals and groups to accept computer conferencing? A major reason is the threat of fundamental change to the already familiar communication processes that is posed by this technology. As a result, people attempt to maintain their current framework by denial, distortion, or other forms of resistance. Often this leads to rejection of computer conferencing for seemingly trivial reasons.

Realizing its potential while, at the same time, recognizing the inherent difficulties with introducing the technology, the Department of the Army started experimenting with computer conferencing to develop issues and ideas on its future needs. What evolved in 1983 was the *US ARMY FORUM*, designed to establish functional computer/electronic networks for the purpose of addressing Department of the Army issues. Chapter Five will look at the *US ARMY FORUM* to explore the utility of computer conferencing in large and complex organizations.

## CHAPTER FIVE

### US ARMY FORUM

The US ARMY FORUM uses computer conferencing technology to "provide the Army with geographically dispersed, multi-disciplinary teams capable of rapidly integrating the flow of critical information in order to enhance the total Army mission." (38) Since its inception, FORUM has grown to over 1600 participants among some 40 conferences. To begin to fully grasp the scope of US ARMY FORUM, however, one must review its evolution and structure.

#### US ARMY FORUM-Evolution

The US ARMY FORUM evolved from what was known as *Task Force Delta*, a "small think tank" involving five officers at TRADOC Headquarters and ". . . a network of 45 volunteers both within and outside the military." (42) Established in 1976, its purpose was to resolve the issue of how to ". . . close the gap between actual and potential force readiness." (42)

A major accomplishment was development of the systems based, multidisciplinary approach to problem solving and adoption of a circular non-hierarchical structure, which was goal and value based. . . . [in 1980 Delta Force was moved to the Army War College and] began experimenting with computer-based teleconferencing as a means to develop issues and ideas around the future needs of the Army. (42)

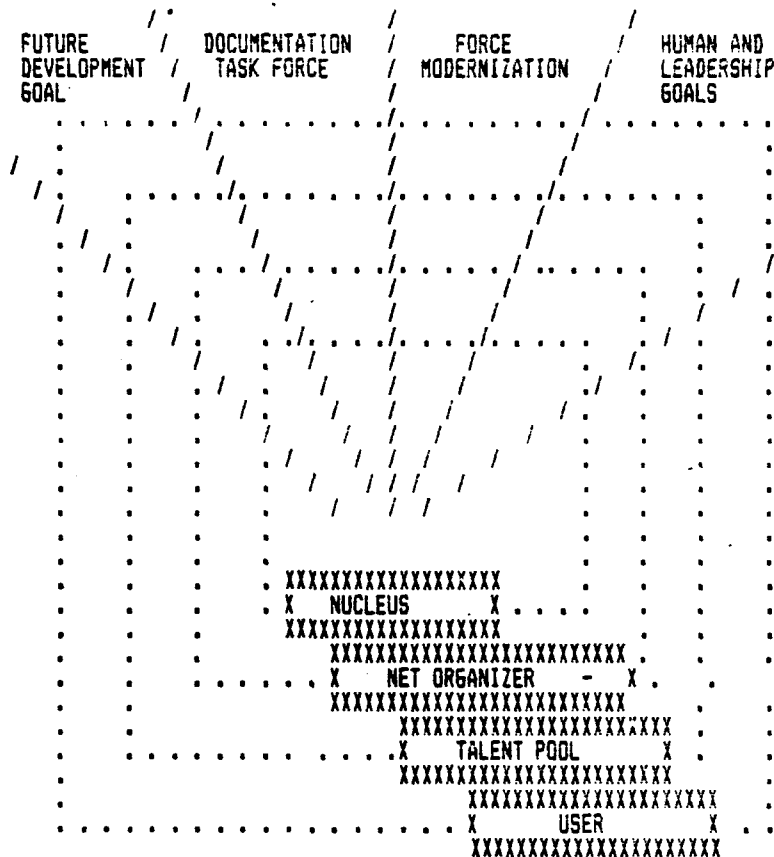
In 1983, upon recommendation of the Director of the Army Staff (DAS), US ARMY FORUM was established to carry on the mandate given Task Force Delta/Delta Force. The following excerpt was one of FORUM's first discussion items as participants strove to conceptualize its purpose, structure, and focus.

Item 2 18:01 Nov17/83 168 lines No responses  
Army Forum Prime=1  
US ARMY FORUM

#### THE U.S. ARMY FORUM

PURPOSE OF THIS ITEM	This item outlines the FORUM's purpose, structure and operating strategy.
SUMMARY	<p>The FORUM is a voluntary group of soldiers and citizens who contribute ideas and concepts to Army leaders.</p> <p>The FORUM is organized as a non-hierarchical network of soldiers and civilians with a diverse inter-disciplinary experience and academic background. They contribute their time and diverse talents to assist the Army in dealing with complex issues.</p> <p>The FORUM is administered by the Director of the Army Staff through the Director of Management, Office of the Chief of Staff, Army.</p>
PURPOSE OF THE FORUM	FORUM's purpose is to assist the people of the Army to turn knowledge and experience into wisdom and a framework for action toward improving the Army's ability to improve itself. The theoretical base for this purpose statement is double loop learning. (Argyris and Schon)
FOCUS	The initial focus is on the Army Goals and systemic issues (Force Modernization).
VALUES AND PARTICIPANT CHARACTER- ISTICS	The values of the FORUM include: reciprocal commitment, responsible candor, personal and professional responsibility, demonstrated courage, multidisciplinary teamwork, applied creativity, and loyalty. Because these values are sought in each member, the characteristics of the individual, rather than the position the individual occupies, are the criteria for participation. Many academic and military disciplines are represented. Strength in diversity and a variety of experiences and abilities give FORUM its capability for providing cross-disciplinary objectivity. Participants are organized into conferences. As some participants become inactive or resign, they are replaced by new members. Recruiting of new participants is a selective process. Consideration for selection is a combination of proven individual expertise and a personal willingness to dedicate time and energy to the mission of FORUM.

OPERATING STRUCTURE IS NON-HIERARCHICAL The circular organization of the FORUM provides cross-cutting, multi-disciplinary ability to bring the talents of a very diverse group of people to bear upon the Army's complex problems.



- NUCLEUS The center circle (Nucleus) would consist of a full-time staff and a "Board of Governors". (Members of the Board have not been identified, but they are to be part of the senior leadership of the Army.)
- SUB-NET ORGANIZERS The next circle contains the subnet organizers--people who have demonstrated accomplishments and have earned respect for being able to think, do, turn concepts into products and find applications. The organizer also has the willingness to take the lead, motivate and champion a concept.
- TALENT POOL The next circle is the talent pool--individuals who have demonstrated knowledge in their area, a dedication to the values and who can be formed into teams or subnets to address particular issues. The talent pool also challenges the concept and provides a reality check.
- USERS The outer ring consists of the users for the products. The user makes demands on the network and is the entry into the formal Army system. This allows an open, continuing communication between the user and the talent pool and subnet organizers working an issue.

**OPERATING  
STRATEGY**

To work a specific issue, the Core Group would bring together the people from all circles who can best contribute to the specific need. The organization would work with the user to create a well-defined product. The operating strategy is designed to support the concept of productivity, stability and adaptability leading toward an Army of Excellence through:

1. Assisting organizations to develop a total system perspective.
2. Availing ourselves of new technologies, approaches and developments that will help us manage change.
3. Establishing linkages with real world concerns which have meaningful impact on the Army.
4. Using what we know, learn and discover to help the Army to help itself.

**COMPUTER-  
BASED  
TELECON-  
FERENCING**

A computer-based teleconference provides a means by which group discussion, group decisionmaking and exchange of messages and information is accomplished without having all members physically co-located or working on identical time schedules. This is done using a computer system which acts as the central clearing house for information processing. The computer system maintains the group discussion. An individual participant can enter the conference at any time by using a data terminal connected to the system by a commercial telephone call.

**FORUMNET**

The FORUM conference is named FORUMNET. Each participant is issued a separate user number and password. User numbers issued to participants are coded so that members normally sign on directly to a subnet. FORUMNET is principally a central control net in which a variety of topics (some of which may be under discussion in a subnet) are under discussion at any one time. The key to the FORUM's operation is the subnets generally focused and organized around the Army Goals and Force Modernization. The rationale behind the separate subnets is that these subnets will generally have a complex and detailed discussion around the issues of a particular goal. This will insure that initial discussion is accomplished by individuals who have a given knowledge or area of expertise on the subject matter. These sub-conferences can be short-term or ongoing. They will generally be restricted to invited participants only. FORUMNET will insure a multidisciplinary approach to an issue by introducing the recommended idea or problem solution on the other subnets for further comment and critique before releasing it to the user group.

(43)

Today, US ARMY FORUM is the term applied to the Army's overall conferencing organization and each individual conference is called a *subnet*. When a person wishes to join a particular conference or con-

ferences, he/she is first taken through a well-defined series of steps. It is useful to introduce the reader to this process to gain an appreciation of FORUM's unique structure.

### US ARMY FORUM-Structure

FORUM uses Advertel Communication System's CONFER II as its computer conferencing software. This is done using a host mainframe computer at Wayne State University in Detroit, Michigan. CONFER II and, therefore, FORUM subnets can be accessed through a number of commercial or military data networks--Telenet, Tymnet, Autonet, Merit, DDN, Arpanet, etc.--if the user has the following:

- o Personal computer or terminal with ASCII, or American standard, keyboard.
- o MODEM using full-duplex, asynchronous communications at 300-, 1200-, or 2400-bps.
- o A user identification code, normally assigned by the conference organizer, and an associated, individual password.

The following telecommunications session shows the ease with which an individual would access US ARMY FORUM using a common communications software, such as *PROCOMM*, with a personal computer via one of the more common data networks, Telenet. Explanations of subsequent commands are provide in bracketed italic print. For obvious reasons, the access code, user identification code, password, and the identity of the "new participant" are fictitious; however, the rest of the data was downloaded from an actual session on US ARMY FORUM.

> [ACCESS TO TELENET]

CONNECT 1200  
<cr><cr>  
-----

TELENET  
205 148

> [DEFINE TERMINAL TYPE]

TERMINAL=01 <cr>  
-----

> [CONNECT TO MERIT DATA NETWORK]

@C 010101 <cr>  
-----  
010 101 CONNECTED  
ZMerit:X.25 (DT26:TX04:CRT)

> [DEFINE HOST MAINFRAME COMPUTER]

Which Host?WU <cr>  
-----

ZTE04:DT26-DT2A:WU22

MTS Wayne (Host=WU Task=258 Dev=DT22)  
#Telenet network surcharges in effect:  
# Connect time \$2.50/hour  
# Packet charge \$0.75/kilopacket

> [SIGN ON WITH INDIVIDUAL ID CODE]

#SIGNON ZZZZ <cr>  
-----

#Enter password.

> [ENTER INDIVIDUAL PASSWORD]

? \_\_\_\_\_ <cr>  
-----

#Terminal,Low,Commercial,WSU  
#Last signon was at 18:49:25, Wed Jan 20/88  
#User ZZZZ signed on at 18:43:12, Thu Jan 21/88

##Run \$NEWS for latest news & information - new item entered 1/18/88  
# RE: 2400 bps dial-in access to merit now available in Detroit

NOTICE: Material appearing here should be considered the Author's  
personal views, and does not represent official policy of the  
US Army or of the author's organization!

WARNING: For UNCLASSIFIED discussion only! This system is NOT secure!

Confer II (08/85) - designed by Robert Parnes  
Copyright & Trademark: Advertel Communication Systems

At this point, the participant is about to automatically join a  
unique subnet known as ARMY:ENTRY. The purpose of ARMY:ENTRY is to  
serve as an umbrella for US ARMY FORUM; that is, it funnels all entries  
into FORUM's conferencing network. This structure allows FORUM to main-  
tain a current list of all conference participants, form a elementary  
talent banking capability, aid in security management, identify types of  
equipment, and identify communications requirements. Additionally,  
ARMY:ENTRY establishes a basic database to meet other Department of  
Defense (DoD) requirements.

The telecommunications session with US ARMY FORUM continues:

\*\*\*\*\* WELCOME TO ARMY:ENTRY AND THE U.S. ARMY FORUM \*\*.\*\*\*\*\*

At 'DO NEXT?', type: 'J' or 'JOIN' to join your home net.

1 new participants

Russ C. Armstrong 205-361-1914 ZZXC:MF  
Major, USAR. Student at the Army's Geneological Research Center (GRC).  
P.O. Box 11235  
Ft. Conroy, NY 98991  
Interested in the geneological impacts on AirLand Battle. Equipment is an Zenith  
Z-100 and Hayes SmartMODEM 1200 via Telenet.  
- - - - -

	New:	Item	Resp	Bltn
ARMY:JFDPNET	-	-	-	-
ARMY:ForumNet	2	7	-	-
ARMY:ExcelNet	-	4	2	-
ARMY:LICNET	1	5	-	-
ARMY:NetOrgNet	-	2	-	-

ARMY:TACTICS	-	-	-
ARMY:Entry	-	-	-
ARMY:ForumTng	-	1	-
ARMY:TerrorNet	-	-	-
ARMY:LEXSYS	11	2	-

DO NEXT?  
-----

It is in ARMY:ENTRY where the user gets an overview of the activity in the subnets he/she is permitted to access. For example, ARMY:JFDPNET has had no activity since the user's last log-on; ARMY:LEXSYS, on the other hand has eleven (11) new items of discussion and two (2) responses to previous items.

To carry the telecommunications session to its next logical step, the author joined ARMY:FORUMNET. ARMY:FORUMNET can best be described as a transparent subnet; that is, all participants are allowed access to discuss general areas of interest to the Army and DoD. Although it is not a requirement to enter ARMY:FORUMNET prior to other conference(s), most participants keep abreast of its activity.

DO NEXT? JOIN:ARMY:FORUMNET <cr>  
-----

Welcome to ARMY:FORUMNET, the teleconference dedicated to informal and timely discussions of wide ranging topics of general DOD interest.

0 new participants

New responses on items:  
289 294 315 331 334 337 340

New items: 341-342

DO NEXT?

The initial message in ARMY:FORUMNET is formatted identically like that of all the other subnets, with the exception of ARMY:ENTRY; that is, the participant is presented the purpose statement, a list of new participants, a list of new responses, and a list of new items. Then at the *DO NEXT?* prompt, the individual may use simple CONFER II commands to initiate one of several common actions:

- o Read (and respond to) new items.
- o Read (and respond to) new responses.
- o Review (and respond to) old items and/or responses.
- o Enter a new discussion item.
- o Transmit a private message to another individual.
- o Read new message(s) from another participant.
- o Read a three-line descriptor of new or old items.
- o Find a variety of miscellaneous information, such as a keyword search of participants (e.g., USAF) or a keyword search of items (e.g., security).
- o Get help.
- o Join another subnet.
- o Quit--leave US ARMY FORUM.

Again, these are just a few examples of the capabilities of this conferencing system.

Appendix D lists US ARMY FORUM's subnets. It shows the name of the subnet, proponent agency, net organizer, and purpose. By reviewing the purpose statements, it should be obvious that FORUM addresses a broad range of issues affecting the Army's mission.

### US ARMY FORUM-Accepted or Tolerated?

As US ARMY FORUM grew, organizers and participants were concerned whether it was totally embraced by Army leaders. In 1985, one of FORUM's more active members asked that very question--is FORUM accepted or tolerated? The following discussion sheds some light not only on the capabilities and dynamics of computer conferencing, but some accomplishments and general direction of US ARMY FORUM at the beginning of 1985.

Item 77 19:52 Feb03/85 62 lines 22 responses  
Alex Wojcicki Prime=72  
US Army Forum: Accepted or Tolerated?

Well, FORUM will be around for another year! I'm glad to see the annual zero-based justification requirement, and I'm damned glad Mike Rodier and company carried the fight so well! I do have a serious question, though! Is FORUM an accepted medium to tackle Army needs, or is it merely permitted? (Obviously, the CSA has accepted it; but does that mean the rest of the Army has?) I continue to get the 'vibrations' from many senior people that this is NOT a good thing! Too much open communication is 'bad'! It becomes obvious after hearing this time after time that the protective WE-THEY attitude is still deeply ingrained in many minds. Perhaps this mentality is an artifact of our military system.

If we want to progress from 'tolerated' to 'accepted' by the Army as a whole, we are going to have to get the senior service schools to begin to teach the strategy and tactics of the network. We must begin to alleviate the fears of many people that a network is destructive! We here have come to accept this medium, with its built in advantages and disadvantages, because we UNDERSTAND it, and are therefore not threatened by it! We must begin to communicate this understanding we have to those who should be the primary beneficiaries of this capability, the leadership of the Army.

In my opinion, here's what needs to be taught:

- \* What is a network? How does it differ from 'traditional' means of organizational communications? What are the advantages and disadvantages of a networking scheme of communications within a hierarchical organization?
- \* How to understand why things are said the way they are. Why does one feel uncomfortable with open communication? How to overcome that feeling of anger over a statement from a perceived junior?
- \* Case examples of what some of the nets have done for the Army? DOCMOD at least is a good example...

Here's my O-M-R for this item, and these are the areas I'd like to see commented on:

1. Do we really need to gain acceptance, rather than tolerance, of FORUM, and it's modus operandum? Is FORUM already accepted? (Go back to sleep, Mojo; where have you been?)
2. Should the concept of networking be taught in the schoolhouse? If so, where? C6SC? SSC? What content?
3. How should we proceed in this task, assuming the idea is OK? How long would it take to get it 'built in' to the system?
4. Who, among the leadership, would actively support the proposal? Who would actively oppose it? Why?
5. What resources do we have here on the nets to make this happen? People? Ideas?

The following is the actual series of responses to this discussion item with the participants' names changed for reasons of propriety. It is important for the reader to observe the candor with which most responses were made. Also, the reader should note the presence of other important ingredients in effective group communication, i.e., humor, sincerity, etc., all made without great regard for syntax, spelling, or other recognized formalities associated with written communication.

Although there is a general inability to convey nonverbal communication, once an individual is familiar and comfortable with computer conferencing techniques and etiquette, communications are intensified, not degraded. Additionally, many of the responses should reinforce many of the benefits and advantages stated in Chapter Four.

#### 22 responses

Feb04/85 08:20

77:1) Participant #1: I FEEL THAT THE WHOLE NETWORK SHOULD BE TAUGHT, NOT JUST GIVEN AS A "HO-HUM" TIME FILLER IN THE SERVICE SCHOOLS. ONE OF THE THINGS THAT WE DON'T DO WELL IN THE SERVICE IS TALK TO EACH OTHER, EXCEPT WITHIN OUR OWN LITTLE WORLD OF OFFICES OR UNITS. THE CROSS OF IDEAS AND INFO OVER THIS KIND OF NETWORK COULD BE SUPER-BENEFICIAL. ALSO, ONE OF THE THINGS THAT MUST BE TAUGHT ALONG WITH TELECOMMUNICATIONS IS THE COMPOSITION OF THE NETS, WHO, WHERE, MISSION, ETC. THE TEACHING SHOULD START IN THE BASIC OFFICER CLASSES ALONG WITH THE SR NCO COURSES. THE HEADS (ORGANIZERS) OF THE NETS SHOULD BE WITH THE LEAD DA ACTIVITIES WHO DEAL WITH THE MISSION AREAS OF THE NETS ON A DAILY BASIS SUCH AS FORCENOD BEING HEADED UP BY THE DA

FORCE MOD OFFICE, ANALOG BY THE DA LOGISTICS ACTIVITIES (AMC OR DAMO), ETS. AS FAR AS THIS NET, I THINK THAT C6SC WOULD BE THE PLACE BEST TO SERVE AS THE LEAD (THIS WOULD ALSO GET THE STUDENTS INVOLVED). I GUESS THE REAL QUESTION FOR THE FUTURE OF ALL OF THE NETS IS WHETHER WE ARE GOING TO BE JUST A BUNCH OF PEOPLE TALKING ON THESE NETS OR AN EFFECTIVE GROUP WHO CAN GET THINGS DONE.

Feb06/85 14:53

77:2) Participant #2: YES! Mojo, as usual, you've hit the proverbial nail quite squarely. The educational intervention you're proposing would be enormously beneficial to the acceptance of The Forum and this technology, and would certainly enhance our collective capacity to get good things done quickly.

Feb06/85 20:38

77:3) Participant #3: area 2- Networking is a broader subject than just the enabling technology. It is in a lot of ways a core skill for the Warrior 2000 leader. Couldn't networking be integrated into the philosophy that drives our leadership doctrine and training at all levels of instruction and practice? Seems to me that the important piece of all these nets is the process by which we learn to operate; not so much the media (computer-based teleconferences). If you teach how networking works, why it's a valuable professional and social methodology, and then reinforce it with some behavioral examples (one of the 20 plus Forum nets, how to build your Rolodex, mapping your "good ol' perm" environment, or whatever) that you might grow some folks that get turned on enough to legitimize networking as a real staff and command process. It seems to be one of those things that once you make the leap into doing it in one context, you "can't not" network in all contexts.

Feb07/85 01:57

77:4) Participant #2: Right, xxxxx! An excellent source for theory and techniques relevant to all that is The Networking Institute, P.O. Box 66, West Newton, MA 02165 Telephone (617) 965-3340.

Feb08/85 08:18

77:5) Participant #4: If we're not teaching networking in the Basic and Advanced Courses, then we're making a big mistake. Every effective leader understands the value of the informal, unofficial group leader (I've forgotten the academic term for that dude). From squad leader thru battalion commander (that I know of--higher than that, I hope), good leaders understand that the formal leaders (chain-of-command) are effective only when the informal leaders (peer leaders, or whatever) are also effective. This is networking. What we don't teach (or practice) well is networking outside of unit boundaries, and it's this sort of networking that teleconferencing does so well. I'm in favor of exposing (intentionally vague) Army officers to teleconferencing (as an extension of networking, i.e., effective leadership) at the Advanced Course and again at CASS, then requiring participation while at C6SC. By the time officers reach SSC level, they should already know so much about it that they wouldn't dream of taking on any kind of significant project without using the FORUM as a resource.

I agree with the sales techniques described above. How about this? Let's have each (OK, maybe only one initially) School Commandant set up a "Commander's Net." Think of it: A network in which all Infantry (or whatever) battalion (and maybe brigade) commanders are linked electronically to the proponent (who would presumably have his department heads also on

Feb08/85 08:28

77:6) Participant #4: the net). Imagine how much better our Infantry battalions would be (Just 'cause we're the best doesn't mean we can't get better) worldwide, how much better would be the communications between the schoolhouse and the "real world", and how much more credible Mother Benning would become. I can see this hypothetically: A battalion commander in Germany completes a rivercrossing exercise and has his list of lessons learned. He loads them on the net and says, "Mother Benning, your FM xx-xx was superb except in Chapter 5 which almost killed three of my troops.

Feb08/85 08:43

Feb08/85 17:46

Feb09/85 08:10

Hi	.	.
.	Random	Controlled
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.	Change	Change
Lo	.	.
Lo	.	Hi

Example? Ask the guys in HQDA DAPE-HRL-L about pain. They have always been very able and they have probably always understood that X=H. The advent of the 1985 Army theme (Leadership) kinda drove their pain index up a little. When they saw that the Forum and its subnets could mold and move H, they began clamoring for a 1985 theme net. They accepted the Forum. End soap box.

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Feb11/85 16:52

77:10) Participant #7: I APPLAUD THE DISCUSSION OF TRAINING OUR FUTURE LEADERS TO NETWORK. THIS COMMENT, WOJO, REFERS TO COMMENT AREA 1. ....NO. we don't need to be accepted. we must, however, be perceived as USEFUL. if we ever get to the point where everything we say here is received non-defensively, then chances are we're not saying anything USEFUL. networks are the army's opportunity to innovate. if we replicate the communication, thinking and decision patterns of the formal system, we will no longer be as useful. STANDARDIZE, ORGANIZE, and FORMALIZE a network and you "ENTROPYIZE" it. yet working to institutionalize a value for networking does make sense. [there are impressions that] networking is directly contrary to chain-of-command communication, so we can expect to raise a few hackles, wojo. networking could undermine chain-of-command (we've all had experiences with the "old boys" or "old girls" network superceding chain-of-command). what we need to get folks focused on is that networks also SUPPORT the established hierarchy. one way we are doing that is to use networks to address issues the hierarchy supports. (that's the essential difference between the docmod net work and the old deltanet in one of it's more iconoclastic moments). as xxxxx said, networks are more than hardware...they're a way of thinking and operating. we can encourage that way of thinking/operating by paying attention to successful applications of networking principles..

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Feb11/85 16:55

77:11) Participant #7: like using a cross-functional network as an organization structure as the ACSIM organizational integration teams are doing.

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Feb11/85 19:50

77:12) Participant #3: To answer your question on when networks become burdens xxx xxxxx (and to build a bit on some other comments)...seems to me that when you lose the connection between the process and the product and the need, you no longer have anything worth doing. The key is to get folks in the habit of identifying with the system that's one level out from where they live, to take them out of peer competition (one unit against another) and to ensure they get feedback (positive or negative) on how it's going. I know that's pretty simplistic, but lots of nets have failed because we didn't attend to it. Maybe we also ought to study what behaviors and attitudes our better net organizers exhibit and see if they can be cloned in leadership training?

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Feb12/85 09:13

77:13) Participant #7: good point xxxxx, about feedback. watching nets come and go over time, proves out systems theory...IT'S POSITIVE FEEDBACK from the larger system that makes a net thrive. analog net and xxxxx xxxxx's management thereof being one live example.

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Feb18/85 13:00

77:14) Participant #8: FORUM has supporters and detractors in most organizations and at most levels of the hierarchy. It is not unlike any other innovation in that respect. (HIERARCHY!!) Some of the suspicion arises from those who see a mantle of mystique thrown around it. If treated more matter-of-factly as a tool for information gathering, some of the concern may be quieted. Here, we view FORUM as an extension of a literature search. We are not afraid to pick up a book, magazine article or paper. Why fear seeking leads or opinions from experienced folks? Perhaps part of the problem is rooted in the semantics of the community. I think the more conservative among us lack trust in social/behavioral methods. Words such as "networking" have a negative connotation to them. Despite the fact that FORUM does not violate chain of command - it supports it - "hot" words will never work. Teach the use of FORUM and like nets in every Army school as professionally, not with religious fervor.

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Feb21/85 13:24

77:15) Participant #9: There is an excellent article in PC magazine on the effects of an electronic network on the organization. Basically, 90% of all communication is non verbal, such as eye cues, posture, voice tone etc. In

the network these status cues are not there. The breakdown of hierarchies occurs in a network, and the only response from those who feel threatened is punitive. Now, this tells us some interesting things about those who are threatened.

We know that we have two types of leaders. Those who have internalized their self worth and strength, and are secure in their position, and those who have achieved their position on the basis of the peter principal. Those folks who have not internalized their positions, rely on the external symbols of their position, the office desk, the brass on the hat, the uniform, all those power totems that they have relied on for power, in a network situation, are gone! Thus, we see the real internal state of power and fitness in

the networking environment. This insecurity, naturally breeds attack as a defensive mechanism for compensation. We all know individuals whom we have enough trust in their competency and leadership we'd follow into the gates of hell. There are also those who don't have the risk taking competency to clean a latrine. The electronic network will separate out those who are effective leaders and those who are not! Now, the other

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Feb21/85 13:32

77:16) Participant #9: point is that those who are threatened cannot turn back the clock. In a previous DF concept paper I outlined the levels of warfare, in the evolution of Chemistry, physics, nuclear, directed energy, and cybernetic.

The press of technology is on. They institutions can not resist the development of the weapons systems into the cybernetic phase. This requires computer literacy. This has the same import as being able to read did in the 15th century. The need for education is important beyond belief. The OSI systems that are in the pipeline require the kind of experience and understanding that can only be gained from interaction in an electronic network. Those who disagree are in the same position as the french leading calvary charges into german machine gun positions, a noble idea, but not relevant to victory. The institutional people have a choice, to be on the power curve of the wave, or behind it playing catch up. In our current velocity of R&D there is no excuse for technological illiteracy.

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Feb22/85 08:35

77:17) Participant #1: xxxx, VERY WELL PUT. NOW, HOW DO WE GET TO THERE?

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Feb25/85 16:18

77:18) Participant #5: FROM xxxx xxxx xx xxxxx: COMMENT. THE WAY TO GET ACCEPTANCE IS TO PRODUCE SOMETHING OF VALUE. TEACHING NETWORKING IN SCHOOLS WILL GAIN NOTHING. ANOTHER THOUGHT. DO WE WANT EVERYBODY ON A NETWORK OF SOME SORT? ARE WE READY FOR THAT? MY ADVICE. WORK HARD. DO GOOD. ACCEPTANCE WILL COME.

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Mar15/85 17:48

77:19) Participant #10: If 90% of all communication is non-verbal then the method of current networks, IE having to type and READ information must evolve to a level of visual information processing as described in the ALTERNATIVE FUTURES concept of xxx xxxxxxxx. We are a visual society based on the proliferation of the IMAGES produced in TV, PLAYS, MOVIES, and now computer graphics. When technology progresses to the point of providing VISUALS for processing information, much like the video dis technology has to offer, networks will become the true communi cative tool of choice.

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May23/85 09:02

77:20) Participant #11: reference xxxxx (response 6) - Networking is an attitude, not just a capability - else every one would be networked. This is what I sense Wojo is getting at, HOW DOES ONE CHANGE AN ATTITUDE. In xxx xxxxx's example, just because the Infantry was finally wired together, what maykes one think that they would talk, net to share with all the other pressures of things to do. In my opinion, people network because it is perceived to be of value to them. If this is the case, how do we cause this perception to be a reality through out the Army. Training/Education is certainly one answer and that needs to happen at all levels. A second approach (concurrently) is that the networks must produce value. It takes skills and patience to focus and direct a net. A problem as I see it with

the Army's networks is the lack of trained champions of a cause on each net, with the ability to drive the net to resolution of issues, and thus to productivity, or at least perceived productivity. This is why DOCMOD was so successful and INFOHGT (in my opinion) a disappointment.

Reference xxxxxx response #10, Networks don't have to be in opposition to the chain of command, but rather be a bridge across the chains at common levels of thought and action independent of geographic location. This again was the greatness of DOCMOD. Yes, the Army had a Documentation problem, but no one at any level lower than the VCSA had the ability to fix the whole shooting match - Will continue --

May23/85 09:08

77:21) Participant #11: On the network, people from the TOE, MTOE, Force Structure, and Distribution communities (read - chains of command) could meet as on a patio to discuss common problems, resolve issues and develop recommended actions to be taken through official "Chain of Command" channels. We are like people living in tall highrise appartments, trying to have a conversation witheach other by shouting across the balconies to each other. Networking is not a "Conference Phone Call", but rather agreeing to meet on the patio to relax, talk and get to understand each other so that we can better solve issues when we do have those "conference phone calls".

Well, I've probable violated Wojo's guidance and strayed enough, so I get back down off the soapbox and see y'all on the patio.

May24/85 19:23

77:22) Participant #12: WELL SAID, xxxx. I LIKED THE PATIO EXAMPLE.

(46)

The 4 Cs. The values participants aspire to within US ARMY FORUM are termed *the 4 Cs*:

- o *Courage*--they say it.
- o *Competence*--they know what they are talking about.
- o *Candor*--they are responsible.
- o *Commitment*--they are active.

These values form the basis for candid, thoughtful discussions on a broad number of issues; the 4Cs engender the spirit essential for FORUM to function effectively and produce innovative, thoughtful approaches to problems facing today's Army.

Yet, several misperceptions have been voiced about computer conferencing in general, and US ARMY FORUM specifically. Therefore, a complete discussion of FORUM would not be complete without briefly addressing them.

### US ARMY FORUM-Misperceptions

In general, the common misperceptions about FORUM stem from misunderstandings of computer conferencing technology--those which the author has attempted to explain in this research paper. Three main concerns are:

o *FORUM bypasses the chain of command.* Computer conferencing forms an electronic network that expands a hierarchical bureaucracy horizontally rather than vertically. Traditional vertical structures lack the ability to rapidly link people with the right experience and knowledge to solve many of its problems, especially those faced by large and complex organizations. The advantage offered by FORUM is an *informed chain of command* better able to function effectively, not one whose authority has been abrogated. (40:2)

o *FORUM is all talk, but no action.* Many of the benefits derived from FORUM are intrinsic--they are not easily measured. There have been, and will be, specific products produced through FORUM's discussion process; however, FORUM has been most accurately described as a "third party advisor." (40:3) What this means is, FORUM is able to

provide an essential ingredient in today's Army--an infusion of innovative thought into the initial stages of staffing and problem-solving processes.

o *FORUM participants are a bunch of hackers.* Generally, this belief is held by those unfamiliar, and thus uncomfortable, with computer conferencing, its techniques, and potential. As a result of the unknowns involved in the process, these people are often threatened by the eventual product. On the other hand, leaders familiar with the technology encourage diverse opinion, assimilate the various positions, and then determine the most appropriate course of action. (40:4)

#### Summary

As the author has pointed out, there are critics within the Army who honestly question the benefit of computer conferencing technology. Advocates, however, feel Army leaders at all levels will inevitably recognize its potential.

There will always be those dyed-in-the-wool dark-agers who resist any change from the way things have always been in the past. They are just like many horse-calverymen and mule drivers who refused to believe to the bitter end that tanks and trucks were going to be the Army of the future. . . . Computers are as much a part of the Army as bullets [and] . . . networking by computer today is only a fraction of what it will become in the future.  
(40:4)

Although US ARMY FORUM is a new phenomenon, it is not a panacea--there are limits to its effectiveness. It does, however, offer Army leadership the opportunity to continuously tap a knowledgeable team of

geographically separated individuals who are as committed as they are to enhancing Army goals. The key is a readiness to accept innovative thought--not necessarily as the final answer, but as an essential ingredient in that answer.

US ARMY FORUM was a bold step by bold leaders who recognized and acted on an *opportunity for new directions*.

## CHAPTER SIX

### SUMMARY/CONCLUSION

At this point, the reader may be asking. . . "Summary/Conclusions, so soon?" To address that concern, it is appropriate to review the hypothesis of this research paper:

→ Computer conferencing is low-cost application of technology which has proven its capability to unleash the synergistic potential of individuals with like areas of interest. The author's opinion is that in a time of renewed budget constraints, computer conferencing can help eliminate many overhead costs of on-going group discussions, education and training programs, and ultimately enhance established decision-making mechanisms. Above all, however, computer conferencing can provide the Air Force with an opportunity for new directions in its effort to enhance mission effectiveness and achieve stated goals.

*Keywords: Telecommunications,  
Computer mediated Communication System, (ICP)*

In Chapter One, the author stated the purpose of this paper was simply to shred away the mystique surrounding computer technologies and present an appreciation for the potential of computer conferencing. It is clearly beyond the scope of this particular research project to develop a specific "laundry list" of potential uses for computer conferencing in the Air Force. It is the author's hope that this paper will stimulate thought and help build support for service-wide implementation of a computer conferencing network. Clearly additional research is required to determine the best short- and long-term applications for the Air Force. It is also evident that the most timely and appropriate

method would be through a group research project sponsored by Air University, either Air Command and Staff College, Air War College, or a combination of both.

Such a project was recently undertaken by a group of Army War College and Army Command and General Staff College students in an study sponsored by the Army Vice Chief of Staff, General Arthur Brown. In a message to senior Army leaders, General Brown explained:

On 17 Jul 1987, I was briefed on the *Living Expert System* [italics added], an innovative off line decisionmaking concept linking subject matter experts on a computer data link. Designed to pool centers of expertise, and assist decisionmakers in rapidly gathering opinions and information, LEXSYS has a great potential as a decision support mechanism for the Army. It's [sic] outreach capability will help recover more of the Army's investment in training and education. I see this as a potentially valuable tool in the Army decisionmaker's inventory.

I consider this an appropriate topic for a group research project at Carlisle. The added research by students in this year's AAWC class might well provide what is needed to bring this concept to its full potential. (45)

It is within the scope of this research paper, however, to suggest several broad areas for consideration in any future study of the potential of computer conferencing in the Air Force.

#### Potential Uses for Computer Conferencing in the Air Force

The reader need only scan the list of US ARMY FORUM subnets contained in Appendix D to stir his/her imagination of how computer conferencing could be applied in their particular organization. If the

reader can visualize potential applications, then this research paper will have fulfilled its purpose. That is, the reader has gone beyond the fear of, and the mystique surrounding, computer technology as it applies to computer conferencing and has progressed to the point he/she can begin to explore its full potential.

At this point, it is reasonable to suggest some broad areas for implementing computer conferencing.

People Programs. As General Larry D. Welch stated in a March 1988 Air Force Times interview, "It's the people who make the Air Force, it's the people who produce combat readiness. So we have to look after them first." (13:9) Computer conferencing offers considerable potential for meeting the increasing demands and expectations of beneficiaries during a time of substantial fiscal constraint. Some areas to consider would be:

- o Establishing a family support center conference for use not only by personnel involved in the operation of these centers, but eligible beneficiaries, as well.
- o Establishing appropriate health care conferences. These may include support networks for programs such as *Children Have A Potential* (CHAP), and physical health conferences for discussion of issues such as smoking cessation, aerobic exercise/physical fitness, stress reduction, executive health, etc.

Professional Military Education. This area provides tremendous potential for introducing computer conferencing.

- o Application to non-resident/correspondence courses. James S. Cary (LtCol, USA), in a proposal to the Director, Corresponding Studies of the US Army War College, has suggested a five-year, phased study on integrating computer conferencing into the Army's two-year war college correspondence curriculum. This integration would not affect the course's desired learning objectives, but would enhance the pedagogics of the curriculum. (4) Air University should explore these possibilities in its correspondence courses.
- o Application to resident courses. Several blocks of instruction in both ACSC and AWC lend themselves to additional off-line discussions. These include leadership, strategy, doctrine, etc. A spin-off from this effort would be the introduction of computer conferencing to the future leaders of the Air Force.

#### Operational Issues.

- o A conference addressing operational safety issues would increase the timely exchange of information regarding flight, ground, occupational safety, and health issues.
- o A conference sponsored by the major commands could link operational commanders. These conferences would possibly include representatives from the Staff Judge Advocate, Surgeon General, Chaplain, personnel, etc., to provide timely discussion of commanders' issues.

- o A training conference could expedite the exchange of information regarding on-going training programs, such as Red Flag, Blue Flag, etc. Additionally, innovative training programs developed by units could be shared with others via the computer conference.
- o A conference could be established specifically for Air National Guard and Air Force Reserve issues.

#### Decision-Making Processes.

- o The Air Force could establish a talent bank of knowledgeable personnel familiar with computer conferencing to aid in providing inputs for decisionmakers. The concept could follow very closely with that suggested in LEXSYS by the Army Vice Chief of Staff, General Arthur Brown.
- o Individual commanders could link key people off-line through computer conferences.

Technical Information. The rapid expansion in the personal and professional use of microcomputers by Air Force personnel would warrant a conference solely dedicated to technical issues on microcomputer applications.

#### Conclusions/Recommendations

During the research for this paper, the author has come to two major conclusions. The first is *computer conferencing does offer the Air Force tremendous opportunities* if applied correctly and without the presumption that it is a panacea for every leadership or managerial

problem faced by the Air Force. If applied properly, however, this technology offers a powerful tool to complement those already at the disposal of these leaders.

The second conclusion is that *there is, and will continue to be, a resistance to the introduction of this technology.* The major reason will remain a fear of computer technology. This extends beyond the obstacle of actually facing the equipment but, as computer literacy expands, many people will be faced with a new fear--perceived incompetence in front of one's colleagues, a significant form of peer pressure. The other aspect in this area is a reluctance of our current leaders to accept computer conferencing. There is, in fact, a cultural difference between current senior leaders (general officers and colonels) and company grade officers. It simply may be that one group grew up and learned with this technology and the other did not. Whatever the reason, too often the result is a delay in the implementation of more innovative applications of computer technology, including computer conferencing.

Recommendations. Given the opportunity and willingness to explore the potential of computer conferencing, the author would make three modest recommendations.

- o Air University should take the lead in researching specific applications of computer conferencing throughout the Air Force. This should be done as a joint ACSC/AWC research project sponsored by the Commander, Air University.

- o The opportunity exists to immediately explore a small-scale Air Force computer conference to augment portions of the ACSC and/or AWC curriculum and expose future Air Force leaders to the potential of this technology. This could be done by requesting US ARMY FORUM to sponsor a subnet dedicated to this effort. Although Air University would have to fund the operational costs of the net, it would not have to incur significant start-up costs.
- o If research recommends broader application of this technology, the Air Force should give strong consideration to using the same conferencing software used by US ARMY FORUM--CONFER II. Not only is CONFER II regarded as very effective software, it would insure Army-Air Force computer conferencing interoperability to allow a broad exchange of joint issues and ideas.

#### A Final Word

The author's research has highlighted one fact--computer-mediated communications systems are here to stay. The business world has recognized this, and the US Army has recognized this. It is time for the Air Force to seriously explore the opportunities provided through this technology.

As effective as the Air Force is in executing its mission, the efficiency of its administration and conduct of operations often comes under close scrutiny and criticism. A discussion of any

"efficiency/effectiveness" issue is beyond the scope of this paper; however, the author believes computer conferencing offers the Air Force a rare opportunity to incorporate an extremely efficient method of group interaction--one with the potential for significant savings while, at the same time, facilitating value-added discussion on issues that could affect both the short- and long-term health of the service.

The hypothesis of this research paper was that ". . . *computer conferencing* can provide the Air Force with *an opportunity for new directions*. The author remains hopeful that our leadership will recognize its potential and proceed to introduce computer conferencing in those mission areas where this technology can have a positive impact.

## APPENDIX A TELECOMMUNICATIONS SESSION

The session begins by selecting "3- AWC Library" from *PROCOMM's* dialing directory. The software automatically dials the number ("ATDT293-2087") and once the 1200-bps connection is made ("CONNECT 1200"), the user presses the computer's carriage return twice ("

### PROCOMM DIALING DIRECTORY

DIALING DIRECTORY						
Name	Number	Baud	P	D	S	E CMD File
1- Datastorm Technologies	1 314 449-9401	2400	N	8-1	N	
2- TELENET	269-0090	1200	E	7-1	N	
3- AWC Library	293-2087	1200	E	7-2	N	
4- .....	.....	1200	N	8-1	N	
5- .....	.....	1200	N	8-1	N	
6- .....	.....	1200	N	8-1	N	
7- .....	.....	1200	N	8-1	N	
8- .....	.....	1200	N	8-1	N	
9- .....	.....	1200	N	8-1	N	
10- .....	.....	1200	N	8-1	N	
=> 3						
R Revise	M Manual Dialing	Entry to Dial				
P LC Codes	D Delete Entry	F Find				
PgUp/PgDn Page	L Print Entries	Scroll				
Home Top Page	End Bottom Page	ESC Exit				
Modem Dial Cmd: ATDT		LD Codes Active:				
Dial Cmd Suffix: !		Com Port Active: COM1				
AUTO DIALER						

--> 3 <cr>

ATDT293-2087  
CONNECT 1200

APPENDIX A  
TELECOMMUNICATIONS SESSION

--> <cr><cr>  
-----

042 Book Collection            - GEAC LIBRARY SYSTEM -        \* NEWS

Air University Library

NORMAL OPERATING HOURS:

M-TH: 0730-2200

FRI: 0730-1700

SAT: 0800-1700

SUN: 1300-1700

SPECIAL HOLIDAY HOURS:

DEC 28-31, M-TH: 0730-1700

JAN 01-03, FRI-SUN: CLOSED

WE WILL RESUME NORMAL OPERATING HOURS  
ON JANUARY 4, 1988

-----  
HAPPY NEW YEAR FROM THE AUL STAFF!  
-----

Welcome to the Online Catalog  
You're Gonna Love It!

More news to come...

Press CARRIAGE RETURN to continue

--> <cr>  
-----

042 Book Collection            - GEAC LIBRARY SYSTEM -        \* NEWS

Please check the card catalog for DOCUMENTS, only a few documents are in the  
the online system.

New books recently received by the library have been assigned a temporary  
call number while they are being added to the collections. This temporary  
number is 000.0. You may perform a call number search using 000.0 to call up  
a complete list of books in process. Then, to be notified when one of the  
books becomes available, just leave a printout of the complete record with  
your name and telephone extension at the Reference Desk.

To print any screen, hold SHIFT and press FB.

HAVE FUN!!!

If you need help, just ask a friendly librarian--

Press CARRIAGE RETURN to continue

--> <cr>  
-----

042 Book Collection            - GEAC LIBRARY SYSTEM -    ALL \*CHOOSE SEARCH

What type of search do you wish to do?

1. TIL - Title, journal title, series title, etc.

# APPENDIX A TELECOMMUNICATIONS SESSION

2. AUT - Author, illustrator, editor, organization, etc.
3. A-T - Combination of author and title.
4. SUB - Subject heading assigned by library.
5. NUM - Call number, ISBN, ISSN, etc.
6. KEY - One word taken from a title, author or subject.
7. PAT - Patron information: your fines, loans, holds, etc.

Enter number or code, then press CARRIAGE RETURN

--> 4 <cr>  
-----

042 Book Collection - GEAC LIBRARY SYSTEM - ALL #SUBJECT SEARCH

Start at the beginning of the subject and enter as many  
words of the subject as you know below.

When you can, be specific.

Ex: Molecular biology (NOT biology)

Enter subject, then press CARRIAGE RETURN

--> teleconferencing <cr>  
-----

042 Book Collection - GEAC LIBRARY SYSTEM - ALL #SUBJECT SEARCH

Your Subject: TELECONFERENCING Matches 2 subjects

	No. of citations in entire catalog
1 Teleconferencing.	2
2 Teleconferencing -- Equipment and supplies.	1

Type a number to see more information -OR-  
FOR - move forward in this list BAC - move backward in this list  
CAT - begin a new search CMD - see additional commands

Enter number or code, then press CARRIAGE RETURN

--> 1 <cr>  
-----

042 Book Collection - GEAC LIBRARY SYSTEM - ALL #SUBJECT SEARCH

Matches 2 citations

Ref#	Author	Title	Date
------	--------	-------	------

# APPENDIX A TELECOMMUNICATIONS SESSION

1 Cowan, Robert A.  
2 Vallee, Jacques.

Teleconferencing : maximizing human> 1984  
Computer message systems / 1984

Type a number to see associated information -OR-  
IND - see list of headings CAT - begin a new search  
CMD - see additional commands  
Enter number or code, then press CARRIAGE RETURN

--> ind <cr>  
- - - - -

042 Book Collection - GEAC LIBRARY SYSTEM - ALL \$SUBJECT SEARCH

	No. of citations in entire catalog
1 Teleconferencing.	2
2 Teleconferencing -- Equipment and supplies.	1
3 Telegraph.	2
4 Telegraph -- Chile.	1
5 Telegraph -- Equipment.	7
6 Telegraph -- Handbooks, manuals, etc.	1
7 Telegraph -- History	1
8 Telegraph -- Laws and regulations.	1
9 Telegraph -- United States.	1
10 Telegraph -- United States -- Employees.	1
11 Telegraph -- United States -- History.	2
12 Telegraph -- United States -- Laws and regulations	3
13 Telegraph, Wireless.	12

Type a number to see more information -OR-  
FOR - move forward in this list BAC - move backward in this list  
CAT - begin a new search CMD - see additional commands

Enter number or code, then press CARRIAGE RETURN

--> 2 <cr>  
- - - - -

042 Book Collection - GEAC LIBRARY SYSTEM - ALL \$SUBJECT SEARCH

TITLE: Advanced technology multi-media communications teleconferencing syst>  
IMPRINT: Brooks AFB, Tex., September 1987.

Location	Call Number	Cpy #
DOCS /DOCIRC	M-U 42583-11 no.86-72	1

FUL - see complete citation IND - see list of headings  
CAT - begin a new search CMD - see additional commands

Enter code then press CARRIAGE RETURN

--> ful <cr>

APPENDIX A  
TELECOMMUNICATIONS SESSION

-----  
042 Book Collection            - GEAC LIBRARY SYSTEM - ALL \*SUBJECT SEARCH

TITLE:    Advanced technology multi-media communications teleconferencing  
         system : power supply market research and analysis.

IMPRINT: Brooks AFB, Tex., September 1987.

PHYSICAL FEATURES: 14 p.

SERIES: AFHRL-TP / Air Force Human Resources Laboratory.

NOTES:    CALL NO.: M-U 42583-11 no.86-72

OTHER AUTHORS, ETC: Shoup, Anthony L. & Boyles, Charles M., MSgt, USAF.

SUBJECTS: Computer networks. & Teleconferencing -- Equipment and supplies. &  
         Electric power failures.

GOVERNMENT DOCUMENT NUMBER: AFHRL-TP-86-72

BRF - see locations and call numbers

CAT - begin a new search

IND - see list of headings

CND - see additional commands

Enter code then press CARRIAGE RETURN

--> end <cr>

^ft]i

NO CARRIER

-----

APPENDIX B  
HEATH USERS' GROUP (BBS)

PROCOMM DIALING DIRECTORY

DIALING DIRECTORY						
Name	Number	Baud	P	D	S	E CMD File
1- Datastore Technologies	1 314 449-9401	2400	N	8	1	N
2- TELENET	269-0090	1200	E	7	1	N
3- AWC Library	293-2087	1200	E	7	2	N
4- HUG	1 616 982-3956	1200	N	8	2	N
5- .....	.....	1200	N	8	1	N
6- .....	.....	1200	N	8	1	N
7- .....	.....	1200	N	8	1	N
8- .....	.....	1200	N	8	1	N
9- .....	.....	1200	N	8	1	N
10- .....	.....	1200	N	8	1	N
==> 4	R Revise	M Manual Dialing	Entry to Dial			
	P LC Codes	D Delete Entry	F Find			
	PgUp/PgDn Page	L Print Entries	Scroll			
	Home Top Page	End Bottom Page	ESC Exit			
Modem Dial Cad: ATDT		LD Codes Active:				
Dial Cad Suffix: !		Com Port Active: COM1				
AUTO DIALER						

--> 4 (CP)

ATDT1,616,982-3956

CONNECT 1200

--> (CP)(CP)(CP)

```

: HUGPBBS - Heath Users' Group Personal Bulletin Board System :
:                               Version 2.01.M                     :
: Copyright 1985, 1986, 1987 (c) Heath Users' Group              :
:                               Jim Buszkiewicz                   :

```

--This System Is Available To National HUG Members ONLY.  
 --Control-C (^C) Aborts, Control-S (^S) Pause Toggle.  
 --Baud Rates Available: 300, 1200, And 2400 Baud.

## APPENDIX B HEATH USERS' GROUP (BBS)

Another incoming phone line has been added so busy signals should almost be a thing of the past!!

Bargain Centre orders within the last 3-4 weeks have been delayed due to Heath's physical inventory time. Nothing comes in nothing goes out. Be patient.

The SYSOP Has Allocated A Total Of 30 Minutes System Connect Time.

--> Enter Your FIRST Name: *Jerry* <cr>

-----

--> Enter Your LAST Name Or <cr> For FIRST Name Prompt: *Carpenter* <cr>

-----

Checking Registration...

--> Enter Your Password: . . . . <cr>

-----

You Are Caller Number: 44467

### BULLETINS

-----

\*\*\*\* Control-S Pauses \*\*\*\*

\*\*\*\* Control-C Aborts \*\*\*\*

The Following, Are Descriptions Of Selected Items In The Bargain Centre

-----

#### DES 1

=====

This is an original H-120 All-in-One computer. It doesn't appear to have been modified in any way. It has 2-full height Tandon DSDD Drives. A steal at \$200.

#### DES 6

=====

These disks appear to be of very high quality. Typically, when I format a standard HUG disk on a Hi-Tech Z-248 drive, I get about 8-10% in bad sectors, and we use high quality Dysan disks. These disks result in about 3-9% in bad sectors. For standard 360k drives, they're unbeatable! These disks are from Interdyne, the manufacturers of backup tape drives. Each disk has support software on them and come sealed 3 to a pack. The labels on each disk appear to be easily removeable for fanatics like

## APPENDIX B HEATH USERS' GROUP (BBS)

myself who don't like to double up on labels. Again, these disks were written to only once, and then sealed up 3 to a pack. Take 'em away at a buck a pack. Since we have 3 large cases of these packs, you can order more than one pack by placing the numbers of packs you want, after your NAME when you order. You will be charged for \$1.00 times that number. Please NOTE: These are NOT 1.2meg disks, they are high quality, 48TPI, Double Sided Double Density.

--> Function Or <H>elp: h

-----

SS --> Scan Subject Headers	C --> Database Catalog
SR --> Scan And Retrieve	U --> Upload A File
SQ --> Scan Quick	D --> Download A File
SM --> Scan And Match	T --> Talk To Sysop
RI --> Retrieve Individual	L --> Log-In Retry
RC --> Retrieve Continuous	G --> Goodbye (Disconnect)
E --> Enter A Message	I --> First Time User Info
K --> Kill A Message	B --> Retype All Bulletins
M --> Minutes Connect Time Left	H --> Print This List
OI --> How To Order Instructions	OL --> View HUG Bargain List
OO --> Place An Order	

--> Function Or <H>elp: ss

-----

System Contains Messages:  
2373 To 2500

--> Scan From Which Message: 2373

-----

Msg.#	Subject
-----	-----
2373	Hard disk Security.
2374	Hard Disk Security
2375	VOTRAX TYPE & TALK
2376	New system
2377	ZPC SECTION?
2378	X-10 COMPUTER INTERFACE SOFTWARE
2379	zps section
2380	QBasic 4.0 and ZPC
2382	Items for sale
2383	FTM patch for ACD9
2384	2100 COLOR VIDEO RAM
2385	WORDSTAR 4
2386	Hard Disk Security

APPENDIX B  
HEATH USERS' GROUP (BBS)

2387	Qbasic and ZPC
2388	Video Board
2389	WORDSTAR 4
2390	Syquest drives
2391	H-120
2393	H-120
2394	Syquest drives
2395	Z100 Video board
2396	EMS or EEMS board for Z-151
2397	Messages
2398	BBS FILE
2399	PC-151,150 HARD DRIVES
2400	H/Z-151 Disk Anamolies
2401	Certificate Maker and ZPC
2402	Z100 Hard Drive
2403	EMS or EEMS board for Z-151
2404	Hard Disk Reliability
2405	C/G EMULATOR FOR MONO CARDS
2406	EMS or EEMS board for Z-151
2407	WANT-TRADE
2408	H-8
2409	H-87
2410	VIDEO BOARD
2411	Monitor Rom
2412	Z100 FOR SALE
2413	For Sale
2414	Video Chips
2415	FOR SALE
2416	Certificate Maker and ZPC
2417	Monitor Rom
2418	For Sale
2419	BAD CONNECTION
2420	x-10 computer interface software
2421	Getting Started with Sierra Games
2422	BSAVE Format
2423	Wanted H-89 disk controller
2424	8" SOFTWARE FOR SALE
2425	PCX, TIFF, RES, etc
2426	Zcomm
2427	Getting Started with Sierra Games
2428	Monitor Rom
2429	ZAXXON
2430	Running Sierra games on Z-159
2431	arc520.com
2432	arc520.com
2433	RE: ZPC and Certificate Maker
2434	Craig Armstrong
2435	Alive and kickin'

APPENDIX B  
HEATH USERS' GROUP (BBS)

2436	H120 DESI COMPUTER SALE, IS THIS STI
2437	Z-100 HARD DISK CONTROLLER
2438	ZAXXON
2440	HOW TO DOWN LOAD
2441	PRICE REDUCTION - 8087 & V-20
2442	"Taming the Wild Interrupt"
2443	Zcomm
2444	Alive and kickin'
2445	8" CPM SOFTWARE - THE WORD
2446	HOW TO DOWNLOAD
2447	download
2449	THE WORD
2450	Getting Started with Sierra Games
2451	Z148 E6A
2452	BSAVE Format
2453	Zcomm
2454	BSAVE Format
2455	Adaptec HD Controllers
2456	H-89
2457	Sierra Games and Z159
2458	ORDER FOR LX-86 PRINTER
2459	dos/rom-b
2460	Z-100's for Sale
2461	dos/rom-b
2462	Moron Sierra Games/Z159
2464	Monitor Rom
2465	arc520.com
2466	COMMUNICATIONS
2467	Connecting Z158 to Z181
2468	UPGRADE 161 TO 640K
2469	DOWNLOADING
2470	your help
2471	ZPC and FoxBASE
2472	ZPC & WS4 & FoxBase
2473	H-89 (M#: 2456)
2474	FAST!!!
2475	PASCAL
2476	your help
2477	PASCAL
2478	divide overflow
2479	Sierra Software
2480	divide overflow
2481	PASCAL
2482	MS-DOS Z-100
2483	Certificate Maker & ZPC (#3)
2484	COMMUNICATIONS
2485	For Sale
2486	For Sale

APPENDIX B  
HEATH USERS' GROUP (BBS)

2487            COMMUNICATIONS  
2488            FAST!!!  
2489            PASCAL  
2490            For Sale  
2491            PASCAL  
2492            \*\*  
2493            HDrv/Controlleer  
2494            DOWNLOADING  
2495            ZComm  
2497            divide overflow  
2498            H89 SOFTWARE FOR SALE  
2499            Hard Disk Reliability  
2500            ANGI.SYS

--> Function Or <H>elp: ?i  
-----

System Contains Messages:  
2374 To 2501

--> Enter Message Number (0 To End) : 2374 <cr>  
-----

#: 2374  
Dt: 12-18-87 13:24:56  
Fr: thomas lisanti  
To: Larry Bollman  
Sb: Hard Disk Security

Hello Larry, I just read your last message and wondered what exactly are you looking for ? There is a program called PCLOC11F (or something like that) that a friend of mine had. It was shareware I believe. It really locked out the hard disk. Even if you booted from a floppy the hard disk was simply not there as far as DOS was concerned. If you would like it and can't find it on the BBS's let me know I'm sure my friend might have his copy still.

--> Enter Message Number (0 To End). : 2389 <cr>  
-----

#: 2389  
Dt: 12-21-87 16:38:20  
Fr: Pat Swayne  
To: SANFORD SHAPIRO  
Sb: WORDSTAR 4

Run Configur and set the printer driver to strip the high bit. Be sure to configure it back the other way when you want to do graphics.

APPENDIX B  
HEATH USERS' GROUP (BBS)

--> Enter Message Number (0 To End) : 2500 <cr>

-----  
#: 2500  
Dt: 01-10-88 17:17:38  
Fr: GENE SALLEE  
To: ALL  
Sb: ANSI.SYS

DOES ANYONE KNOW HOW AN ANSI.SYS FILE COULD PREVENT BOOT UP BY  
DUMPING THE REGISTERS AND SENDING ME INTO THE MONITOR PROGRAM?

--> Enter Message Number (0 To End) : 2501 <cr>

-----  
#: 2501  
Dt: 01-10-88 23:50:41  
Fr: BOB OLSON  
To: ALL  
Sb: COMMUNICATION PROTOCOLS

CAN SOMEONE TELL ME WHERE I CAN FIND SOME INFO ON THE VARIOUS PROTOCOLS  
(XMODEM,YMODEM ETC.)? THANKS!!!

--> Enter Message Number (0 To End) : 0 <cr>

-----  
--> Function Or <H>elp: c

-----  
DATABASE CATALOG

\*\*\*\*\*  
\*\* All the these catalogs are in ASCII and can be 'read' using selection \*\*  
\*\* number <1> when downloading. It is not necessary to use XMODEM protocol. \*\*  
\*\* \*\*  
\*\* A version of the archiving utility 'ARC' can be found in PCMSDOS.008, \*\*  
\*\* or just download the file, ARCS20.COM, and execute it. It will create \*\*  
\*\* several files, including the documentation, and the achiving program, \*\*  
\*\* on your disk. If you have an H/Z-100 or PC Compatible System, this \*\*  
\*\* should probably be the first file you download since most of the \*\*  
\*\* programs are in 'ARCHived' format. \*\*  
\*\* \*\*  
\*\* To download ALL the PC Compatible catalogs, just download the three \*\*  
\*\* files: PCCAT01.020, PCCAT21.040, and PCCAT41.060. \*\*  
\*\*\*\*\*

APPENDIX B  
HEATH USERS' GROUP (BBS)

TITLE -----	SIZE -----	LAST UPDATE -----	DESCRIPTION -----
HOWTO.USE	1536		Information on this database
HDOS.001 2324	01-16-87	HDOS Public Domain Program Catalog #1	
HDOS.002 2446		HDOS Public Domain Program Catalog #2	
HDOS.003 1237	11-23-87	HDOS Version 3.0, and other stuff	
HDOSCAT.ALL	6243	11-23-87	Complete listing of HDOS catalogs 001 thru 003. Each listing is formatted with form-feeds between each catalog.
CPM.001	2106	01-16-87	CPM Public Domain Program Catalog #1
CPM.002	1603	02-05-87	CPM Public Domain Program Catalog #2
CPM.003	2723	03-19-87	CPM Public Domain Program Catalog #3
CPM.004	822	04-08-87	CPM Public Domain Program Catalog #4
CPMecat.ALL	7283	04-08-87	Complete listing of CPM catalogs 001 thru 004. Each listing is formatted with form-feeds between each catalog.
MSDOS.001	3148	01-16-87	Games/utilities/misc. for the H/Z-100
MSDOS.002	704	09-08-86	Games/utilities for the H/Z-100/100PC
MSDOS.003	3254		Games/utilities for the H/Z-100/100PC
MSDOS.004	1928	01-16-87	Games/demos/utilities for H/Z-100/100PC
MSDOS.005	1731	11-23-87	Utilities for the H/Z-100 & EE-8088
MSDOS.006	727	11-23-87	Utilities for the H/Z-100
MSDOSCAT.ALL	11404	11-23-87	Complete listing of H/Z-100 MSDOS catalogs 001 thru 006. Each listing is formatted with form-feeds.
GERNWARE.ALL	18299	08-26-87	A noteworthy collection of public domain programs for the H/Z-100 only. About 3.5 megabytes in all, courtesy of Gernware Enterprises.
ZP150.001	520	11-05-86	Programs for the ZP-150 Laptop
PCMSDOS.001	1196		Games for the PC
PCMSDOS.002	1366		Games for the PC
PCMSDOS.003	1198		Games for the PC
PCMSDOS.004	789		Games for the PC
PCMSDOS.005	992		Games for the PC
PCMSDOS.006	1037		Games for the PC
PCMSDOS.007	932		Games for the PC
PCMSDOS.008	2222	03-06-87	Utilities for the PC
PCMSDOS.009	783	01-16-87	Utilities for the PC

# APPENDIX B HEATH USERS' GROUP (BBS)

PCMSDOS.010	314		Business programs PC
PCMSDOS.011	493	04-06-87	Jim Button's PC-FILE+ for the PC
PCMSDOS.012	958	01-16-87	Business/utility PC
PCMSDOS.013	524		Business/utility PC
PCMSDOS.014	727		Business/utility PC
PCMSDOS.015	929	03-06-87	Business/utility PC
PCMSDOS.016	1206	11-25-86	Games for the PC
PCMSDOS.017	655		Business/utility PC
PCMSDOS.018	1144		Games for the PC
PCMSDOS.019	1302	04-06-87	Business/utilities PC
PCMSDOS.020	1336		Business/utilities PC
PCCAT01.020	20939	04-06-87	Complete listing of PCMSDOS catalogs 1 thru 20. This listing is formatted with form feeds between each catalog.
PCMSDOS.021	1031	03-06-87	Business/utilities PC
PCMSDOS.022	1033		Games for the PC
PCMSDOS.023	876	04-06-87	Utilities for the PC
PCMSDOS.024	752		Games for the PC
PCMSDOS.025	1271		Games and novelties for the PC
PCMSDOS.026	845	09-05-86	Utilities for the PC
PCMSDOS.027	622	05-28-87	Business/utilities
PCMSDOS.028	969		GRASP for the PC
PCMSDOS.029	1100	05-28-87	Business/utilities
PCMSDOS.030	1382	05-28-87	Business/utilities
PCMSDOS.031	1112	11-25-86	Business/utilities
PCMSDOS.032	1932	11-10-86	Games for the PC
PCMSDOS.033	869	01-16-87	Business/utilities
PCMSDOS.034	576	11-25-86	Business/utilities
PCMSDOS.035	600	12-19-86	Business/utilities
PCMSDOS.036	1155	12-19-86	Games for the PC
PCMSDOS.037	563	03-19-87	Business/utilities
PCMSDOS.038	871	04-06-87	Business/utilities
PCMSDOS.039	704	03-06-87	Games/entertainment
PCMSDOS.040	729	04-06-87	Business/utilities
PCCAT21.040	19110	05-28-87	Complete listing of PCMSDOS catalogs 21 thru 40. This listing is formatted with form-feeds between each catalog.
PCMSDOS.041	558	12-19-86	Business/utilities
PCMSDOS.042	908	01-16-87	Games/entertainment
PCMSDOS.043	798	11-23-87	Business/utilities
PCMSDOS.044	1045	03-19-87	Games/entertainment
PCMSDOS.045	663	01-16-87	Business/utilities
PCMSDOS.046	792	01-16-87	Business/utilities
PCMSDOS.047	625	01-28-87	Business/utilities
PCMSDOS.048	711	01-28-87	Business/utilities
PCMSDOS.049	1161	05-11-87	Business/utilities
PCMSDOS.050	936	03-06-87	Business programs
PCMSDOS.051	735	03-19-87	Business programs

APPENDIX B  
HEATH USERS' GROUP (BBS)

PCMSDOS.052	558	03-06-87	Business/hobby/language programs
PCMSDOS.053	1270	04-06-87	Business/utilities
PCMSDOS.054	515	03-19-87	Spread Sheet Program
PCMSDOS.055	630	03-19-87	Information management system
PCMSDOS.056	1139	03-19-87	Utilities
PCMSDOS.057	572	03-19-87	Desktop Organizer program
PCMSDOS.058	1215	06-05-87	Business/utilities
PCMSDOS.059	871	05-28-87	Games/Entertainment
PCMSDOS.060	1129	05-28-87	Utilities
PCCAT41.060	16885	11-23-87	Complete listing of PCMSDOS catalogs 41 thru 60. This listing is formatted with form-feeds between each catalog.
PCMSDOS.061	704	04-06-87	Business/utilities
PCMSDOS.062	857	04-06-87	Business/utilities
PCMSDOS.063	859	05-29-87	Business/utilities
PCMSDOS.064	923	04-08-87	Business/utilities
PCMSDOS.065	1124	11-23-87	Business/utilities
PCMSDOS.066	617	05-28-87	Business/utilities
PCMSDOS.067	936	11-23-87	Business/utilities
PCMSDOS.068	614	11-23-87	Games/Entertainment
PCMSDOS.069	882	11-23-87	Business/utilities
PCCAT61.080	7541	11-23-87	Complete listing of PCMSDOS catalogs 61 thru 69. This listing is formatted with form-feeds between each catalog.

--> Function Or <H>elp: ol

Item	Model	Description	List	Sale	Left
4	OS-63-2	CP/M-86 (Runs Standard CP/M Prgrams)	250.00	25.00	43
5	6DA-1800-3	Bull Horn Speakers	24.95	10.00	2
6	H8-1/3	Original 8k Memory Boards (full)	0.00	5.00	2
7	6DW-2800	RF Security Receiver	300.00	50.00	0
8	HMS-837-5	MicroSoft Macro 80 Assembler CP/M	65.00	25.00	83
9	H-87-T	H-87 w/ 2-Tandon DSDD Drives	900.00	75.00	0
10	PP-221	NEW Epson LX-86 Printer	269.95	158.00	4
11	PF-167	NEW Artisan File Drawer	139.95	57.49	1
12	PF-165	NEW Artisan Print Stand	159.95	64.39	1
13	H-120	All-In-One Computer (see DES #1)	2100.00	200.00	0
14	PF-161	NEW Artisan Hutch	199.95	81.66	1
15	H8-CPU	Original H8 CPU Card	0.00	5.00	1
16	I-DISKS	New 5-1/4" Disks (see DES 6)	0.00	1.00	987
17	HCA-53	Parallel Cable (new)	30.00	12.00	2
18	PF-160	NEW Artisan Desk	199.95	81.66	1
19	ZA-100-1	H/Z-100 Boot ROM Source Listings	0.00	20.00	1
20	HCS-218-T	Tested 10 meg Syquest Cartridges	100.00	20.00	0

## APPENDIX B HEATH USERS' GROUP (BBS)

21	GD-1810	Siren/PA kit for car (looks ok)	99.95	25.00	1
22	PF-152	NEW New Generation Desk	189.95	91.97	4
23	H-87-M	H-87 w/ 2-Half Height Mitsubishi	1200.00	125.00	0
24	PC-121	NEW TecMar Captain Board w/ok	199.95	131.28	0
25	MPI-350-2	MPI-350 Ribbons	0.00	5.00	0
26	CM-5412	CMI 10 Meg Winchester - A-OK	299.00	100.00	0
27	H-89-PAR	9-Port parallel card (see DES #3)	0.00	15.00	0
28	HA-8-3	H-8 Color Card-- MANUAL ONLY	0.00	5.00	0
29	IDSNP	IDS Prism 4 Color Process Ribbon	0.00	5.00	0
30	ZA-170-3	Color Video Card For Z-171	229.00	20.00	0
31	CP/M-BIOS	Bios Listing For Version 2.2.03	0.00	5.00	0
32	MM-100	Mura 300 baud dir. con. modem	129.00	25.00	0
33	WH-42	Hayes Stack Chronograph -- ok!	249.00	35.00	0
34	Z-217-Crds	Winchester Controller Cards-- ok!	1799.00	200.00	0
35	H-89	See DES #2	1895.00	75.00	0
36	H-8-5	2-console H-8-5 kits	250.00	15.00	0
37	181-4507	Original Samz H-100 athr brd-- ok!	1096.00	25.00	0
38	PC-122	NEW Intel Above Board	299.95	197.50	0
39	PM-2250	80 col print puffler (slight dmg)	60.00	10.00	0
40	GDP-200	LUXO magnifier lamp	90.00	20.00	0
41	PKW-105	2- Deluxe Scope Probes	70.00	10.00	0

--> Function Or <H>elp: oi

\*\*\*\*\*  
 \*\* HUG'S Electronic Bargain Centre Usage And Ordering Information \*\*  
 \*\*\*\*\*

### PURPOSE:

To offer HUG members only, electronic products, at unheard-of prices.

### NEW COMMAND DEFINITION:

<OI> displays this file on your screen.

<OL> displays the list of products, each with a short description, the list price, the sale price, and the quantity left.

<OO> Initiates the order sequence. Typing a blank line at any of the ordering prompts (unless otherwise stated) will completely abort the order.

### WHO CAN ORDER:

Any CURRENT HUG member can order providing he/she can access this system.

### CONDITION OF ITEMS SOLD:

In the short description of each item (see the <OL> command), will appear a description word in parenthesis. These words are defined as follows:

## APPENDIX B HEATH USERS' GROUP (BBS)

- (new) - Exactly that. Item has never been opened, and includes full manufacturer warranty.
- (works) - Has been serviced or checked out for some kind of operation. No warranties implied, expressed or otherwise. Absolutely no returns.
- (as-is) - Condition unknown may or may not work. Repairable if necessary. No warranties implied, expressed or otherwise. Absolutely no returns.
- (junk) - Sold only for the parts contents.
- (kits) - May be totally un-assembled, or partially assembled. Kits are given cursory examinations and may or may not be complete. Assume that these are customer returns and the boxes have been opened for one reason or another. Most are complete, and the boxes have been opened only to verify it's contents. Missing or broken parts can be ordered from the heath parts department. KITS ARE SOLD AS-IS ONLY!

### CONDITIONS OF SALE:

- \* Currently, Visa, MasterCard, or CDD orders only. Orders will only be taken by this bulletin board system. Minimum order amount for credit cards is \$10. If an item is less than \$10, a second item will have to be ordered.
- \* HUG ID numbers will be verified current.
- \* Inquiries regarding sale items WILL NOT be accepted. Information on sale items must be obtained elsewhere.
- \* Delivery time will take typically 3-4 weeks. This is due to the unusualness of the system, and the credit card clearance time needed through the HEATH CO. system.

### MISCELLANEOUS:

- \* Items needing further descriptions will carry over into the bulletin file. This file can be read using the <B>ulletin command from the 'Function:' prompt. Product descriptions will correspond with the actual products by way of an assigned 'DES #' number.
- \* Due to space limitations, any item not having a 'condition' descriptor, can be considered to be in 'works' condition.

### ORDERING:

- \* The ordering sequence is initiated by entering '00' at the 'Function:' prompt.
- \* Each line is self prompting and is verified after it is typed in. If a mistake is made after the line is entered, the line can be re-typed.
- \* Only ONE (1) item (quantity of ONE) can be ordered for each ordering sequence. The sequence can be gone through as many times as time will allow.
- \* An item is ordered by ITEM NUMBER ONLY. This is the first number in

APPENDIX B  
HEATH USERS' GROUP (BBS)

the list of bargains (see <OL> command).

\* After all the data is entered, the item quantity left will be verified, and your order confirmed. Remember though, you could be ordering an item at the same time someone else is, so it is possible for an item count to go to zero before your order is confirmed. In this case, the faster typist would have gotten the last item. GOOD LUCK!

--> Function Or <H>elp: a

- - - - -

21 Minutes Of Connect Time Remaining.

--> Function Or <H>elp: g

- - - - -

--> Leave Private Message For Sysop (Y or N)? n <cr>

- - - - -

Goodbye, And Thank You For Calling..

@X

NO CARRIER

## APPENDIX C PRINCIPLES OF FACILITATION

The following discussion was downloaded from an actual computer conferencing session on ARMY:NETORGNET, one of a number of conferences on the US ARMY FORUM. For a detailed explanation of US ARMY FORUM, see Chapter Five.

Welcome to the Net Organizer Net, a computer based teleconference for the discussion of issues unique to the Net Organizer role and future uses of teleconferencing in the management and resolution of key Army issues.

NET ORGANIZER: Ed Feige  
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Item 119 16:00 Dec21/86 29 lines No responses  
Mary George Prime=118  
FACILITATION - PURPOSING OF THE NET

### PRINCIPLES OF FACILITATION

#### THE NET PURPOSE

1. Develop a clearly, stated purpose which is understood and accepted by net participants. Write a purpose item that will be the first item new participants will read when they join the net. Ask them to acknowledge the item and to provide comments that will illustrate the degree of consensus in the group.
2. Reinforce the purpose throughout the life cycle of the net. Revisit the purpose statement periodically to determine if it needs to be modified to meet current needs or if the group needs to be reminded of the purpose.
3. In developing the purpose, include goals for the net and a vision for the future. Determine the reason for the group's existence as an electronic network for conducting Army business. The net must have some functional utility. The purpose for the net must fill a recognized or important need.
4. Development of the purpose is an active process which involves the Net Organizer and all net participants and which is conducted periodically, as required, over time.
5. Review the purpose to determine if the goals have been achieved or usefulness served. Be aware that there may be a time to "celebrate closure".

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## APPENDIX C PRINCIPLES OF FACILITATION

Item 120 16:07 Dec21/86 37 lines No responses  
Mary George Prime=118  
FACILITATION - NET NORMS

### PRINCIPLES OF FACILITATION

#### OPERATING NORMS AND VALUES

1. Develop ground rules for the net which are understood and accepted by net participants. For example:
  - a. "We will log on every day, twice a week, or once a week."
  - b. "We will be active participants ... vs. 'observers'".
  - c. "We will use the net to communicate this or that kind of information. The net is the medium that will be used ... instead of hard copy, backchannel or telephone."
2. Develop norms and values which are consistent with the Army values of courage, competence, candor and commitment. Define these to reinforce consensus in the group to these values and encourage their subsequent participation.
  - a. Courage ... say it.
  - b. Competence ... know what you are talking about.
  - c. Candor ... responsible and timely.
  - d. Commitment ... be active and contribute.
3. Reinforce norms throughout the life cycle of the net. As the Net Organizer, demonstrate the norms of your net, set the example for the rest of the net participants.
4. Define the responsibilities of participants to set the same example for each other and to support the group.

- - - - -

Item 122 16:06 Dec21/86 52 lines No responses  
Mary George Prime=118  
FACILITATION - MANAGING THE PROCESS

### PRINCIPLES OF FACILITATION

#### MANAGING THE PROCESS

1. First of all, recruit the right participants and develop consensus for a common purpose among participants. As the Net Organizer, know and reinforce the net goals. Set an example.
2. Provide feedback to the group. You can do this by providing public support to participants when they make a response to a discussion item and by sending private mail messages to encourage members to become involved in discussions.

## APPENDIX C PRINCIPLES OF FACILITATION

3. Do not try to do all the group facilitation alone. All participants have a responsibility to share the load. Encourage authors of items to be responsible for guiding and focusing discussion and reaching closure on items which they initiate. Item authors should facilitate those discussions just as they would if they were the chairperson at a face-to-face meeting.
4. Continuously, evaluate the value of the information being discussed. There must be value to the participants and to the Net Organizer. The information will usually prove to be of value if it is provocative ... causing action, reaction, change or sustainment of dialogue or action.
5. Communicate results of discussions to the group. Do this as the Net Organizer and make item authors responsible for communicating results of their discussions to the group.
6. Managing the information in the net is very important since a variety of topics are generally under discussion at one time. Each net has an index which is maintained by the Net Organizer to ensure coherence in net discussions and facilitate retrieval of items. Maintain a current index at all times.
7. Regularly, review the timeliness and relevance of all discussion items. Retire and delete items that are no longer relevant or needed for reference.
8. See that the group is outcome oriented. Have a mechanism for turning net traffic into a product that influences thinking and action beyond the net.
9. Ask the net to participate in documenting net successes and benefits to the Army. Identify benefits to the Army which are quantifiable and programmatic. Provide the information to net participants throughout the life cycle of the net and to the Forum Office during preparation for the "Annual DAS Brief". Identify actions which positively impact on the Army's ability to "get the job done".
10. Communicate command emphasis and encourage command participation.

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Item 123 16:09 Dec21/86 118 lines 3 responses  
Mary George Prime=118  
FACILITATION - MANAGING PARTICIPATION

### PRINCIPLES OF FACILITATION

#### MANAGING PARTICIPATION

1. Develop a critical mass of experts. There should be a sufficient number of knowledgeable and credible subject matter experts to sustain discussion and ensure validity of discussion outcomes.
2. Identify participants by name, not office symbol and make the "selection" process personal. Share your vision and the reason their participation is perceived as important. Make a pre-recruit telephone call or send a pre-net backchannel message to disseminate information about the purpose of the net, the kind of participant you are looking for, and the equipment requirements to participate.

## APPENDIX C

### PRINCIPLES OF FACILITATION

3. If possible, conduct an initial face-to-face meeting. It is much easier to iron out start up problems and people may feel more responsible to the other participants if they know that their face/branch/installation is linked to their name.

4. During the recruitment process, instill a feeling of ownership by the participant into the process and the net purpose. The telephone call, backchannel message, and face-to-face meeting are all good techniques.

5. Give out your phone number and encourage participants to CALL if they are experiencing problems or frustrations.

6. Get the participant to a "user friendly" state as soon as possible. Send documentation. Be responsive to technical questions. Provide the name of a local "coach" familiar with the software to assist the new participant if necessary.

7. Realize that equipment must be in immediate proximity to the participant's work area for optimum participation. Equipment is a participant's responsibility. However, the value of your net is enhanced by having the prospective participant gain access. Provide whatever support you can through dissemination of technical information about equipment requirements, through distribution of excess equipment and through "coaches" who may know the local acquisition process.

8. Build a team!!

a. DO facilitate the process for participants to join the net, through distribution of valid ids, documentation, and helpful hints and encouragement.

b. DO ensure that only authorized participants have access to ids and passwords.

c. DO nurture the 4 C's and ensure adherence to agreed upon group norms, including the regularity with which participants will check into the net. You may want to "urge" rather than "demand" participation.

d. DO encourage positive, action-oriented dialogue rather than negative diatribe, finger pointing, or blame fixing. The mark of a pro is to help fix the problem or focus the discussion ... not contribute information about everything that is wrong, wrong, wrong, without offering an alternative or a solution.

e. DO facilitate to keep participants focused on the items or issues at hand. Encourage responsible, professional responses rather than people who merely want to be heard for speaking's sake. The net cannot be perceived as a waste of time by any participant's boss or supervisor. It must be perceived as a credible means by which action officers and subject matter experts share information to do Army business.

f. DO ensure closure on all issues.

g. DO have a mechanism for keeping active participation up. All participants are important to the process. Ensure that all views are heard. Reward individual participation. Even a simple response of "good idea" or "atta boy" is useful.

h. DO encourage meaningful input by participants. Also, be perceptive to input that may not be productive. Be able to identify when discussion

## APPENDIX C PRINCIPLES OF FACILITATION

may become unproductive. Although you do not want to be unnecessarily evaluative of a participant's comments, you do not want to allow a few people to dominate an issue or turn the majority off to the net process.

i. DO prompt participants to stick to the charter of the net and to do their homework, including to provide responsible discussion responses and to provide feedback to the group or the Army at large through "concept papers" or whatever mechanism is decided for your net.

j. DO have a mix of structured and less structured items to appeal to a greater range of participant styles. Encourage participants to enter items in a style that is comfortable for them and that meets the overall purpose of the net to share information.

k. DO keep the focus of the net on a professional basis. Discussions and participants should be committed to the larger cause ... of WHAT'S BEST FOR THE ARMY!

l. DO respect sensitivity of information that might be misrepresented or misinterpreted out of context and respect the confidentiality of information that has been passed in a private mail message to you. Do not transfer that to a public discussion without the permission of the sender.

m. DO review the net purpose with the participants.

n. DO determine guidelines for determining if and when an inactive participant should be removed from the net.

o. DO be aware of net activity that demonstrates that the net may have served its useful purpose and that it may be time to close the net. Survey the participants. Involve them in this process.

9. Have a framework to facilitate housekeeping responsibilities. Share this load with an additional person if necessary.

a. Maintain a current index. Retire and delete information that is no longer useful.

b. Manage administrative details of distribution of ids, documentation and technical assistance.

- - - - -

3 responses

Dec21/86 16:18

123:1) Mary George: Just thought of another here ... be prepared for those people that all of a sudden have not logged on in 1 month, 2 months ... instead of waiting for the 3rd month or even that second one ... have a form letter that you can send to them to try and recruit them back into the fold ... altho it is a form letter for efficiency of getting it out quickly you can still make it friendly, personal and persuasive... any other ideas????

- - - - -

Jan14/87 02:38

123:2) Gene Smith: Mary, you are on a roll and covering all I've said plus some....keep on going!

- - - - -

Jan14/87 17:10

123:3) JOHN GEDDES: Mary, I appreciate your work in putting these out, and they're going to help us on the ARMY21 net a lot.

## APPENDIX D US ARMY FORUM SUBNETS

The following download from US ARMY FORUM lists the current subnets, or conferences, on the US ARMY FORUM system. Of particular interest to the reader should be the "purpose" of each subnet. A review of this list will give the reader a greater appreciation for the broad range of issues that can be addressed through computer conferencing.

**ARMY:ENTRY** The gateway to all US Army Forum subnets. All participants will enter the Forum through ARMY:ENTRY. This net has been established for the purpose of gathering information required by Headquarters, Information Systems Command and for capturing expertise profiles of each person signing onto the system. ARMY:ENTRY provides a central listing of all Forum participants which is accessible by all participants of the system.

ITEMS WILL NOT BE ENTERED ON ARMY:ENTRY.

**ARMY:FORUMNET** A general purpose discussion subnet which allows any participant to enter items for discussion. Everyone on the Army Forum is permitted access to this net.

**ARMY:FORUMTNG** A net established for all users of the Army Forum system who would like to practice entering items, uploading, etc. The net has no relevance to ongoing discussions and is FOR TRAINING PURPOSES ONLY.

NAME OF SUBNET	PROPOSER AGENCY/ NET ORGANIZER(S)	PURPOSE
ARMY:AACONET	TRADOC MAJ Randolph Simmons AV 552-4433 (913) 684-4433	Discussion of Army's immediate future needs in regard to Airborne/Airlift doctrine, organization, training & materiel
ARMY:ACTEDSNET	USTAPA Ms. Beth Jones AV 221-8721 (202) 325-8721	Discussion of informal staffing of training & development relating to the Army career Program

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US ARMY FORUM SUBNETS

ARMY:AFLNET	DCSPER Ms Shauna Whitworth AV 225-7714 (202)695-7714	Discussion of Army family issues
ARMY:AINET	OCSA LTC A. Anconetani CPT Bob Kazimer AV 224-6912	Enhance staffing of ideas, concepts, issues & actions associated with the aims of the Artificial Intelligence Program
ARMY:AMMONET	AMC Mr. Earl McLain AV 746-9177 (205)876-9177	Discussion of ammunition issues facing the Army & requirements of future battlefields.
ARMY:AMMSNET	MAJ Greg Potts AV 224-0313 Mr. Philip Brodowski (703)274-9751/52 Mr. Jay Graver AV 745-3925	Development of Acquisition Mgmt Milestone System documentation updates, policies & the FCG Charter
ARMY:ATT	DCSPER Dr. Ruth Phelps FTS 554-9390 (208)334-9390	Manage conduct of an experimental training program to evaluate the application of the asynchronous teleconferencing technology for Army Officer & NCO training
ARMY:BNCDR	DCSPER LTC Bill Knowlton AV 227-6853 (202)697-6853	DCSPER/ARI leadership assessment project
ARMY:CHAPNET	HQDA LTC Louis R. Trebus (Chaplain) AV 225-1107 (202) 695-1107	To discuss information, issues, and developments as they relate to effective performance of the mission of the chaplaincy.
ARMY:CIDLABNET	HQ USACIDC Mr. John Faes AV 797-7266/68 (404)362-7266/68	To provide communication linkage for the three crime laboratories (Ft Gillem, GA, Frankfurt, GE & Camp Zama, Japan)

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ARMY:CIVPERNET	DCSPER LTC Bill Jersey Mr. Mike Finnegan AV 227-1049/1153 (202)697-1049/1153	Discussion of civilian personnel issues to support Civilian Personnel Modernization Project
ARMY:COASTNET	COE,WRSC Mr. Jay Lockhart Mr. Jerry Greener (202) 355-2305	Exchange of information regarding the Corp's Coastal Engineering Program
ARMY:COHORT	DCSPER LTC Ray Gannaway AV 225-1902 (202)695-1902	To provide action officers in the cohort arena an exchange of information relating to implementation & sustainment of the Unit Manning System
ARMY:CONCEPT	TRADOC LTC Steve Fitzgerald CPT Adolph Ernst AV 552-5270 (913) 684-5270	Discussion of information, issues & developments as they relate to meeting the Army's need for operational concepts
ARMY:DREDGENET	COE, WRSC Mr. Chuck Hummer Mr. Jerry Greener (202) 272-8830	Discussion of Corps' Dredging Program
ARMY:EDNET	HQDA Mr. Dick McLean AV 221-9802/9800 (703) 325-9802/9800	To provide rapid info exchange of issues, and to obtain MACOM input on ACES & CP-31 items, maximizing educational opportunities for soldiers Army-wide.
ARMY:ENGRFORCNET	USA Engineer Schl LTC Tom Farewell AV 354-2382 (202) 664-2382	Discussion of integration of engrs within the combined arms forces at the tactical & operational level of war
ARMY:EXCELNET	TRADOC MAJ Neil Buono LTC Dennis Kennedy AV 552-2384 (913) 684-2384	Discussion of investigating & sharing information on leadership

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ARMY:FINET	DCSOPS MAJ Frederick Lee AV 227-3657 (202) 697-3657	Discussion of force integration issues. Refocus of FORCEMOD
ARMY:HISTORYNET	OCMH Mr. Bill Arthur AV 285-1278 (202) 272-1278/79	Discussion for the military history community to address & share historical information
ARMY:INSTNET	CPT Greg Bradner AV 680-2729	Exchanging information concerning Reserve Component Training among representatives of schools & institutions
ARMY:IROQUOIS	98th Div (Tag) LTC Stan Chorazy FTS 716-338-7400	98th Div Command & Control Net
ARMY:LEAD	COE Mr. Richard Thompson (202) 272-1216	A conference established to assist the Leadership Enhancement & Development Team
ARMY:LEADTEAM	COE Mr. Richard Thompson (202) 272-0545	Discussion of COE Leadership & Mgmt strategy with focus on customer care
ARMY:LEXSYS	OCSA COL Tom Norton AV 242-4815 (919) 242-4815	Discussions of drafting concepts for implementation of a "talent bank" or "living expert system"
ARMY:LICNET	TRADOC CPT George Cassi AV 552-4597/2172 (913) 684-4597/2172	Discussion of Low Intensity conflict doctrinal issues
ARMY:LOGNET	DCSLOG LTC James Henderson AV 224-7329 (202) 694-7329	Discussion of primary weapon systems among logistic oriented experts
ARMY:LRSSNET	DCSOPS MAJ Rik Miant (703) 781-7510	Discussion of information related to the development of a model for future (AD2020) stationing of the US Army

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ARMY:MS-3NET	USAMARDA Ms. B. J. Wroblewski (703) 355-2597	Discussion between HQDA & MACOM program managers for the purpose of increasing coordination & cooperation among various elements of the MS-3 community
ARMY:NETORGNET	OCSA LTC Ed Feige AV 225-8029 (202) 695-8029	Discussions unique to Net Organizers & the future use of teleconferencing in mgmt of Army issues
ARMY:NGBPPD	NGB MAJ Joe Lacroix Mr. Larry Needles AV 731-5407 (501) 758-4053	Discussion of NGB performance & productivity issues
ARMY:QRSA	AMC MAJ Dennis Sexton AV 284-9099/9265 (202) 274-9099/9265	Discussion lessons learned & coordination of issues among QRSAs in the field, the QRSA School & those interfacing the QRSA community
ARMY:PDNET	USAPDA CPT Daniel Maldonado AV 291-5216 (301) 427-5216	To discuss information, issue, and developments as they relate to the effective management of of the Army's Physical Disability activities
ARMY:PRIPNET	CDE, WRSC Mr. Mark Pointoin Mr. Jerry Greener (202) 355-2305	Discussion of information regarding Corps of Engineers' Plant Replacement Improvement Program
ARMY:RANGENET	US Army Training Support Center Mr. Steve Bregmann AV 927-2383 (804) 878-2383	Discussion to enhance management of Army's Master Plan, range construction, range modernization and research, development & acquisition activities for instrumentation
ARMY:RCTRAINNET	TRADOC LTC Jim Kane CPT Greg Bradner AV 680-4375/4105	Discussion of Reserve Component Training issues

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ARMY:RCSTRATNET	TRADOC LTC Jim Kane AV 688-4375	To develop a comprehensive, coherent strategy for the training of ARMY:RESERVE components for the future
ARMY:RFN	OSA COL Howard D. Hill AV 227-3391 (202) 697-3391 (202) 697-3391	Discussion on matters affecting the Reserve Force Policy Gate Reserve Components & mobilization preparedness of the Army
ARMY:RSINET	DCSOPS Mr. Roger Golden AV 227-4242 (202) 697-4242	Discussion to coordinate development implementation of policy & procedures related to Army Rationalization, Standardization interoperability (RSI) operations
ARMY:SAFEPM	OCSA Mr. Craig Schilder AV 558-2029 (205) 255-2029	Discussion of safety information with health & safety personnel
ARMY:SPACENET	DCSOPS MAJ Jeff Barker AV 552-3630 (913) 684-3630	Discussion of Army Space issues, including space concepts, doctrine, requirements, research development training & operations
ARMY:SPECOPS	OCSA Mr. Bob Mountel AV 239-5393	Discussion & exchange of info for development of an effective special operations capability
ARMY:TEALNET	PSO MWO Motteram (703) 756-1376	An international computer conferencing network designed to assist information flow among ABCA representatives
ARMY:TELEEDNET	OCSA LTC James S. Cary AV 225-8030 (202) 695-8030	To improve RC soldiering skills through increased motivational levels achieved through the use of new distance learning technologies such as video and computer conferencing

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ARMY:TNG	ODCSOPS MAJ Harry Meisell AV 227-4651 (202) 697-4651	To discuss information, issues and developments as they relate to training within the commands and agencies, and to facilitate implementation of 1988 Army Theme-Training
ARMY:TNGRESNET	TRADOC CPT Greg Bradner AV 680-2729 (804) 727-2729	Discussion of training related research, current & future
ARMY:UPNET	OACE Mr. Randy Klug AV 227-9567	Discussion related to developments in the effective management of utilization of the Army's real property
ARMY:WARRIORNET	TRADOC CPT Jonathan Hanna AV 552-4818 (913) 684-4818	Discussion of information, issues & developments concerning the mission of the Combined Training Centers
ARMY:WARTRAINNET	TRADOC MAJ Doug Prior AV 680-2717 (804) 727-2717	Discussion of training challenges to Army trainers & exchange of creative training concepts

Individuals desiring to participate/contribute their expertise in a particular subnet should call or send a personal message to the Net Organizer of that subnet.

Anyone desiring more information concerning US Army Forum is encouraged to call LTC Feige at AV 225-8030 or (202) 695-8029.

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## GLOSSARY

This glossary contains definitions relevant to the discussion contained in this research paper. Except as footnoted, definitions have been taken from the "Glossary," in Datapro Research Corporation's Microcomputers.

### A

**acoustic coupler** - a data communications device that converts digital electrical data signals to/from analog tones for transmission over a telephone line through a conventional telephone headset.

**analog** - in data transmissions, refers to signals where values are variable and change smoothly; also refers to components and systems working with and sensitive to such signals.

**applications software** - the instructions that direct the hardware to perform specific functions. Common programs include word processing, communications, database management, graphics, and electronic spreadsheets.

**asynchronous computer** - a digital system in which each operation starts as a result of a signal generated by the completion of the previous operation or the availability of a device required by an operation; contrast with synchronous computer where all operations are started with a master clock.

**asynchronous transmission** - a mode of data communications in which the data stream is inde-

pendently controlled by start and stop elements at the beginning and end of each character; also called start-stop transmission.

**auto answer** - automatic answering; the capability of a terminal, modem, computer, or similar device to respond to an incoming call on a dial-up telephone line and to establish a data connection with a remote device without operator intervention.

**auto call** - automatic calling; a machine function that allows a transmission control unit or a station to automatically initiate access to a remote system over a switched line.

**auto dial** - automatic dialing; the capability of a terminal, modem, computer, or similar device to place a call over the switched telephone network and establish a connection without operator intervention.

**Automatic Data Processing** - commonly used by U.S. Federal agencies as a synonym for data processing (DP) or electronic data processing (EDP).

### B

**baud** - a unit of transmission speed equal to the number of signals events per second. In asynchronous transmission, the unit of signaling speed corresponding to 1 unit interval per second; that is, if the duration of the unit interval is 20 milliseconds, the signaling speed is

50 baud. Baud is the same as "bits per second" when, and only when, each signal event represents exactly 1 bit.

**BBS** - See electronic bulletin board.

**binary digit (bit)** - represents the binary code (0 or 1) with which the computer works. The bit can take the form of a magnetized spot, and electronic impulse, a positively charged magnetic core, etc. A number of bits together are used to represent a character in the computer. Contrast with byte; word.

**booting** - a technique for loading a program into a computer's memory in which the program's initial instructions direct the loading of the rest of the program.

**bps** - bits per second; in serial transmission, the instantaneous bit speed with which a device or channel transmits a signal. Sometimes confused with baud.

**Bulletin board system** - See electronic bulletin board.

**byte** - a sequence of bits handled as a unit; generally refers to eight adjacent binary digits that constitute the smallest addressable unit of data in the system.

## C

**CAD/CAM** - Computer-Aided Design/Computer-Aided Manufacturing; systems that aid in the design of products and then transfer the information to control manufacturing equipment.

**carrier** - a path of known characteristics (e.g., frequency) that can be altered (modulated) to transmit information.

**cathode-ray tube (CRT)** - the vacuum tube used in a TV or video terminal screen; often used to refer to the entire video terminal including the keyboard.

**central processing unit (CPU)** - the segment of a general-purpose computer that controls the interpretation and execution of instructions; it does not include interface, main memory, or peripherals, but it controls input and output units and auxiliary attachments.

**centralized (computer) network** - a configuration in which a central node provides computing power, control, and other services; contrast to decentralized network.

**character** - an individual letter, numeral, or special symbol. In computers, characters are made up of a number of bits. Synonymous with byte.

**CMCS** - see computer-mediated communication systems.

**coaxial cable** - a path consisting of one conductor, usually a small copper tube or wire, within and surrounded by a shield made of a separate, electrically insulated wire.

**cold boot** - the initialization of the computer from an off state [see also warm boot].

**command** - a signal, or group of signals, that causes a computer to execute an operation or series of operations.

**command driven** - programs requiring that the task to be performed be described in a special language with strict adherence to syntax. Compare to menu driven.

**communications line** - any medium, such as a wire or a telephone circuit, that connects remote stations for the purpose of transmitting/receiving information.

**communications protocol** - the exchange of a special sequence of control characters between a computer and a remote terminal in order to establish synchronous communications.

**compatibility** - the characteristic of data processing equipment by which one machine may accept and process data prepared by another machine without conversion or code modification.

**CompuServe** - an information retrieval service which allows for standard timesharing and bibliographic and numeric retrieval.

**computer-aided design (CAD)** - the use of an electronic processing system computer to perform various graphic operations to create specifications.

**computer-aided instruction (CAI)** - a data processing application that aids the learning process; the application usually involves a dialog between students and a program that informs them of their mistakes as they make them.

**computer bulletin board** - see electronic bulletin board.

**computer conferencing** - a system that uses the computer to mediate communication among human beings. (30:xix)

**computer literacy** - implies a basic comprehension level of computers and how to use them.

**computer-mediated communication systems** - systems that use computers and telecommunications networks to compose, store, deliver, and process communication. (14:680)

**computer network** - an interconnection of two or more computer systems, terminals, and/or communications facilities.

**computer program** - a series of instructions or statements formed to achieve a certain result.

**computing system** - a central processing unit with main storage, input/output channels, control units, direct access storage devices, and input/output devices connected to it.

**CONFER II** - a computer conferencing system providing a number of different ways for people to communicate with one another; registered trademark of Advertel Communications Systems, Inc., Ann Arbor, MI. (30:1)

**connect time** - a measure of system usage by a user, generally the interval during which the user terminal was on-line during a session. See also CPU time.

**copy** - to reproduce data in a new location without changing the data in the original source.

**C P / M** - **C o n t r o l** Program/Microcomputer; a family of operating systems developed by Digital Research, Inc.

**cps** - characters per second; a measurement of printer speed.

**CPU** - see central processing unit.

**CPU time** - the interval devoted by the central processing unit to the execution of instructions. Synonymous with CPU busy time. See also connect time.

**CRC** - see Cyclic Redundancy Check.

**CRT** - see cathode-ray tube.

**CRT display device** - that part of a visual display terminal on which images are produced; batches or blocks of information in memory can be instantly accessed, read, and displayed on a screen.

**Cyclic Redundancy Check (CRC)** - a data transmission error detection scheme in which a check character is generated by taking the remainder after dividing all the serialized bits in a block of data by a predetermined binary number.

## D

**daisywheel** - a printer element that contains a series of plastic or metal spokes attached to a central hub. Each spoke contains a fully formed character.

**data** - units of information which can be precisely defined; raw facts and figure which are processed into information.

**database** - a file of information, abstracts, or references on a particular subject or subjects; a collection of interrelated data items with minimal redundancy that can be used and shared by several different subsystems.

**data communications** - the transmission and reception of information, often including operations such as coding, decoding, and validation, among computers and terminals in a network.

**data communication equipment** - the system that provides the functions required to establish, maintain, and terminate a connection, the signal conversion, and coding required for communication between data terminal equipment and data circuit.

**data processing** - the execution of a programmed sequence of operations upon data. A generic term for computing in business situations and other applications.

**data processing system** - a network of machine components capable of accepting information, processing it according to instructions, and producing the desired results.

**data transmission** - the sending of data from one point to another. See also data communications.

**Delphi** - a method for structuring a group communications process so that the process is effective in

allowing a group of individuals, as a whole, to deal with the complex problem. To accomplish this "structured communication," there is provided: some feedback of individual contributions of information and knowledge; some assessment of the group judgment or view; some opportunity for individuals to revise views; and some degree of anonymity for the individual responses.

**demodulation** - conversion of a signal that has been altered into the original signal. See also modem.

**desktop computer** - a microcomputer generally used in a corporate environment that is small enough to be physically located on a desk.

**desktop publishing** - term coined to describe microcomputer-based publishing systems. Such systems usually consist of a microcomputer, publishing software, and an output device (usually a laser printer) and are small enough that they can be placed on a single office desk.

**dial-up line** - a circuit that is established by a switched circuit connection; generally refers to the AT&T telephone network.

**digit** - a character used to designate a quantity. The decimal system uses the digits 0-9; binary system: 0-1; hexadecimal system: 0-F. See also binary digit.

**digital** - a code consisting of a sequence of discrete elements; when associated with computers,

it generally refers to electrical on/off impulses represented in binary by a 1 or a 0.

**digital computer** - a system that solves problems by operating on discrete data representing variable by performing arithmetic and logical processes from a stored program; contrast with analog computer.

**digital data** - information represented by a code comprising a sequence of discrete elements.

**disk** - see magnetic disk; disk drive.

**disk drive** - a direct access, mass storage peripheral that uses magnetic platters to hold information; also called a diskette and fixed (hard) disk.

**Disk Operating System (DOS)** - an operating system that resides in main memory and in mass storage.

**diskette** - flexible surface that is coated with a magnetic material. Used as a storage medium.

**display** - the representation of data in visible form; e.g., cathode-ray tube, lights, or indicators on the console of a computer, or a printed report.

**documentation** - a narrative and pictorial description of a computer system, including operating procedures, system procedures, and application programs.

**DOS** - see Disk Operating System.

**dot matrix** - a method of generating characters in which each character is formed by a grid or pattern of contrasting points.

**double density** - the storage of information in a diskette by doubling the number of tracks per inch, doubling the serial density, or a combination of both.

**down load** - to transmit a file or program from a central compiler to a smaller computer at a remote site.

**dual sided diskette** - a type of storage medium that uses both of its sides to hold information.

**dump** - to transfer all information from a record to another storage medium; e.g., copying from memory to a printer.

**duplex** - the ability to use a partition of a physical communications line.

## E

**E-mail** - see electronic mail.

**8-bit system** - refers to the number of bits in a word that can be processed, stored, and recalled in one machine cycle. Eight bits normally equal one byte; most microcomputers now process 16 or more bits in a cycle [see also 16-bit and 32-bit system].

**8080** - an 8-bit microprocessor developed by Intel. The 8080 was the first chip adapted for widespread use in business microcomputers.

**8085** - a faster version of the Intel 8080; it is software compatible with the 8080.

**8086** - a full 16-bit microprocessor produced by Intel.

**8088** - a 16-bit microprocessor with an 8-bit external structure; manufacture by Intel. The original IBM Personal Computer was based on this microprocessor.

**80286** - a full 16-bit microprocessor manufacture by Intel. The IBM Personal Computer AT is based on this microprocessor.

**80386** - a full 32-bit microprocessor manufactured by Intel.

**electronic data processing (EDP)** - an all-inclusive term liberally interpreted to mean the overall science of using computers to manipulate data. See also data processing.

**electronic bulletin board** - telephone-linked networks formed by users of personal computers who exchange information. (25:363)

**electronic mail** - the transmission of letters, messages, and memos from one computer to another without using printed copies.

**emulator** - a combination of programming techniques and/or hardware features that permits a computing system to perform as though it were another system.

**enter key** - a special function on a terminal keyboard that is used to transmit data on a display screen to a computer. The enter key is pressed after a message is complete.

**EOT (End of Transmission)** - indicates the end of a communications session and resets all stations on the line.

**erase** - to remove information from a storage medium; to clear; to overwrite.

**ergonomics** - the study of the interaction between people and machines.

**error** - a difference between a computed value and the theoretically correct value.

**error detecting and correcting** - a system designed to detect mistakes and request a transmission if the problem cannot be corrected.

**error rate** - the ratio of the amount of data incorrectly received to the total amount of data transmitted.

**execute** - to carry out an instruction or perform a routine.

## F

**fiber optics** - see lightwave communications.

**file** - an organized, named collection of records treated as a unit.

**file server** - in local area networks, a file server is a station dedicated to providing mass storage services to other stations on the network; generally performs file record locking.

**firmware** - program instructions stored in a read-only memory.

**floppy disk** - see diskette.

**format** - a contraction of FORM of MATerial; designates the predetermined arrangement of data.

**full-duplex** - the use of different frequencies by the originating and answering stations to enable communications to occur in both directions at one time.

**function** - in business, a task or process. In mathematics, an algebraic expression describing the relation between two or more variables.

## G

**garbage** - unwanted or meaningless information being stored in a file or used in a process.

## H

**half-duplex** - a circuit designed for transmission alternately in either direction but not both directions simultaneously. Contrast with full-duplex.

**handshaking** - a preliminary exchange of predetermined signals performed by modems and/or terminals and computers to verify that communication has been established.

**hard copy** - machine output in a permanent visually readable form; for example, printed reports, listings, documents, and summaries.

**hard disk** - rigid, random access, high-capacity magnetic storage medium. Disks may be removable

(cartridges), providing off-line archival storage, or nonremovable.

**hardware** - physical computer equipment, for example, mechanical, magnetic, electrical, or electronic devices. Contrast with software.

**home computer** - a microcomputer designed to be used for personal business; generally costs less than \$1000 and runs both games and applications.

**host computer** - the primary or controlling system in a multiple computer network operation.

**host interface** - the link between a communications processor or network and a host computer.

## I

**information** - the meaning derived from data that can be related to data that is previously known.

**information retrieval system** - a complete application for cataloging vast amounts of stored data so that any part or all of the data can be called at any time.

**information system** - a logical group of subsystems and data required to support the data needs of one or more business processes.

**information systems network** - a network of multiple operational-level systems and one management-oriented system (centered around planning, control, and measurement processes). The network retrieves data from

databases and synthesizes that data into meaningful information to support the organization.

**input** - the data to be processed; also the transfer of data to be processed from keyboard or an external storage device to an internal storage device.

**input device** - a device that converts data from one form into electronic signals that can be interpreted by the computer.

**input/output** - a general term for the equipment used to communicate with a computer, commonly called I/O; also the data involved in such communication.

**input/output channel** - a component in a computer system, controlled by the central processing unit, that handles the transfer of data between main storage and peripheral equipment.

**instruction** - a statement to the computer that specifies an operation to be performed by the system and the values or locations of all operands; usually made up of an operation code and one or more operands.

**integration** - the sharing of data or information among subsystems and systems.

**I/O** - see input/output.

## J

**joystick** - a lever used to change the position of the cursor or other position marker on a display screen.

## K

**K** - in computer science, a measure of magnitude that is the equivalent of  $2^{10}$  or 1,024 units. Though K is shorthand for the prefix kilo (as in kilometers), the base 2 orientation of computers makes it a little larger than 1,000. See also byte and character.

## L

**LAN** - see local area network.

**laptop computer** - a computer with the processing power of a desktop computer that is small enough to fit in a person's lap.

**laser printer** - a printing device that uses a laser beam to generate an image after which it is developed with toner and fused to paper using heat and pressure.

**letter quality printer** - a device that generates output that is suitable for high-quality business correspondence; the term implies that output quality matches that of a standard office typewriter. See also daisywheel printer.

**light pen** - a tool for CRT terminal operators that causes the computer to change or modify the display on the cathode-ray tube. The pen's response to light from the display is transmitted to the computer which, in turn, relates the computer action to the section of the image being displayed. In this way, the operator can delete or add text, maintain tighter control over the program, and choose alternative courses of action.

**lightwave communications** - a term coined to identify the use of light as an information carrier. The term is used in place of optical communications to avoid confusion with visual information and image transmission. Fiber optic cables (light guides) are a direct replacement for conventional coaxial cables and wire pairs; the glass-based transmission facilities occupy far less physical volume for an equivalent transmission capacity.

**limited-distance modem** - a device that translates digital signals into analog signals (and vice versa) for transfers over limited distances; some operate at higher speeds than modems that are designed for use over analog telephone facilities.

**load** - in computer operations, the amount of scheduling work, generally expressed in terms of hours of work. In programming, to feed data or programs into the computer.

**local area networks (LAN)** - a system for linking terminals, programs, storage, and graphic devices at multiple workstations over relatively small geographic areas.

**log-off** - the procedure by which a user ends a terminal session.

**logon** - the procedure by which a user begins a terminal session.

## M

**magnetic disk** - a flat circular plate where data can be stored; the information is accessible to reading and writing heads on an

**arm** - which can be moved to a desired storage area as the plate rotates.

**magnetic storage** - devices where information is stored by electrically charging metal or coated plastic tape.

**mainframe** - a class of computer providing large storage capacity, high-speed processing, and complex data handling capabilities.

**main memory** - the primary storage location of a computer; all information stored there is automatically accessible to the computer; contrast with external storage.

**main storage** - generally the memory of a computer where information can be entered, held, and retrieved.

**mass storage** - external disk or tape devices capable of holding a very large quantity of information.

**master control program** - the set of instructions used to initialize and control the computer's memory.

**memory** - area of a computer system that accepts, holds, and provides access to information.

**menu** - a list of commands and available options in a program that are available to a user.

**menu driven** - set of instructions using a list of commands and available options; the user only has to select the desired option; compare to command driven.

**merge** - an operation combining two or more files of information into one in a predetermined sequence.

**message** - a transmission of a set of information over a communications pathway.

**microcomputer** - a small-scale programmable machine that processes information; it generally has a single chip as its central unit and includes storage and input/output facilities in the basic unit.

**microdiskette** - magnetic storage medium enclosed in a 3.5 [inch] hard plastic case.

**microprocessor** - the central unit of a microcomputer that contains the logical elements for manipulating and performing arithmetical and logical operations on information.

**microwave** - high radio frequencies between 1,000 and 300,000MHz.

**minicomputer** - a small- to medium-scale programmable machine that processes information; generally the mid range between microcomputers and mainframes; some can support up to several hundred user terminals simultaneously.

**minidiskette** - 5.25 [inch] magnetic storage medium.

**modem** - MODulator-DEModulator; a device that encodes data for transmission over a particular medium, such as telephone lines, coaxial cables, fiber optics, or microwaves.

**modulation** - the process of converting voice- or data-signal transmission over a network.

**monitor (display)** - a device used to display computer-generated information.

**monitor** - a software tool used to supervise, control, or verify the operations of a system.

**motherboard** - the central card of a computer; it features female connectors that accepts other printed circuit cards.

**mouse** - a hand-held device, separate from the keyboard, used to control the position indicator on a display screen; as the device is rolled along a tabletop, its relative position approximates the position of the indicator.

**MS-DOS** - Microsoft Disk Operating System; a master control program for 16-bit systems. See also master control program.

## N

**network** - communications pathway between computers or between terminals and computers connected for a common purpose.

**network architecture** - the specific design of a communications system, including hardware, software, and protocols to ensure accurate data transfer.

**networking** - the connection of geographically separated computers using transmission lines.

**noise** - signals bearing no information that frequently introduce errors into a data transfer.

**nonimpact printer** - a printer that does not use a conventional ribbon and character hammer for printing.

## O

**on-line** - operating terminals and peripherals in direct interactive communication and under control of a central processing unit; also, a user's ability to interact with a computer through a console or terminal.

**on-line services** - computer functions offered to end users not owning a host computer; includes timesharing, archival storage, and prepared software programs.

**on-line services company** - provides such computer functions as timesharing and prepared software programs to end users connected by terminal to a remote computer.

**operating system** - software or firmware that controls the internal operation of a computer.

**optical character recognition (OCR)** - a light-sensitive scanning process where a device perceives actual character images and converts them into digital code. See also digital.

**optical fiber** - thin strands of glass designed for light transmission.

**OS** - see operating system.

**output** - information emitted from a storage device; any computer-generated information the user receives.

**output device** - external equipment that receives and records information from a storage device or computer; for example, video terminals, printers, and card punches.

## P

**parallel** - several information units travelling [sic] over separate pathways simultaneously. See also serial.

**parity** - an error detection technique that checks for accurate transmission of digital information.

**parity bit** - an information unit that is used to check if digital information has been accurately transmitted from one point to another.

**password** - a confidential word or alphanumeric character string that a program, computer operator, or user must supply to meet security requirements before gaining access to a system.

**PC** - see personal computer

**PC-DOS** - Personal Computer Disk Operating System; IBM's version of MS-DOS for the IBM Personal Computer. See MS-DOS.

**peripheral equipment** - devices external to the central processing unit that perform a variety of input, output, storage, and other tasks; online peripherals are constantly connected, and off-line peripherals are not connected; e.g., printers, monitors, disks.

**personal computer** - a small programmable machine based on microcomputer chips designed for home or business use.

**pixel** - picture element; refers to the dots that form a video screen.

**port** - the connection between an input/output path on the processor and a hardware device; also, to move software from one environment to another (for example, MS-DOS to Unix).

**P/OS** - Professional Operating System; a master control program introduced by Digital Equipment Corporation for its Professional 300 Series microcomputers.

**primary storage** - see main storage.

**printer** - a device that outputs images on paper.

**printout** - information presented on paper.

**process** - performing operations on information.

**processing program** - any group of instructions that is not part of the operating system that runs the computer system.

**processor** - a computer capable of receiving information, manipulating it, and supplying results.

**program** - a group of instructions that direct a computer's tasks.

**prompting** - messages from a computer that give instructions to the user.

**protocol** - a set of rules that govern the exchange of messages across a data communications network.

#### Q

**query** - a request for information entered while the computer system is processing.

#### R

**RAM** - see random access memory.

**random access memory (RAM)** - a storage technique in which the time required to obtain data is independent of the location.

**read-only memory (ROM)** - a storage location where information is permanently stored and cannot be altered.

**RGB monitor** - a color display screen for computers using the primary colors red, blue, and green.

**return key** - when struck, places the position indicator on a display screen at the left margin one line below its previous horizontal position; it is used to end a line of input, a text line, or a paragraph.

**ROM** - see read-only memory.

#### S

**scrolling** - moving the display on a video terminal up or down a line at a time in order to view previous or subsequent information.

**serial** - one bit following another over a single pathway. See also bit and parallel.

**serial interface** - an interconnection that transmits information bit by bit rather than a whole character at a time; they are much slower and cheaper than parallel interfaces; see also parallel interface.

**serial transmission** - the conveying of a character of information one bit at a time. See also bit.

**session** - the interval during which a user engages in dialog with a conversational timesharing system; also the time elapsed from when a terminal user logs on to a system until he logs off the system.

**sign-off** - see log-off.

**sign-on** - see logon.

**simplex** - the capability to transmit only in one direction.

**16-bit system** - refers to the number of 0s and 1s in a word that can be processed, stored, and recalled at one time in one machine cycle; longer word lengths increase efficiency and accuracy but also increase complexity [see also 8-bit and 32-bit system].

**small computer** - single-processor systems. See also personal computer, minicomputer, microcomputer, portable computer and desktop computer [and laptop computer].

**smart terminal** - a user interface having functional capabilities; e.g., editing commands, graphics abilities.

**software** - computer instructions that perform common functions for all users as well as specific applications for particular user needs.

**start bit** - in asynchronous transmission, the signal that indicates the beginning of a data block. See also asynchronous transmission.

**start-stop transmission** - see asynchronous transmission.

**stop bit** - in asynchronous transmission, the signal that follows the transmission of a character. See also asynchronous transmission.

**storage** - a medium used to retain information; it may be internal or external to the computer. See also primary storage [and main storage].

**storage capacity** - the amount of data that can be contained in an information holding device or main memory, generally expressed in terms of "K" bytes, characters, or words; 1K = 1,024.

**store-and-forward** - the process of accepting a message or packet on a communications pathway, retaining it in memory, and retransmitting it to the next station.

**synchronization** - process of adjusting a receiving terminal to match the transmitting terminal's clock.

**synchronous communications** - high-speed transmission of contiguous groups of characters; the stream of monitored and read bits is controlled [by] a clock rate.

**system** - an organized collection of parts or procedures designed to perform a function; generally refers to the processor, peripherals, and software.

## T

**telecommunication lines** - telephone and other communication pathways that are used to transmit information from one location to another.

**telecommunications** - transmission of information using telephone lines and facilities.

**teleconference** - a meeting of geographically separated conferees connected simultaneously, usually via a telecommunications system using a two-way voice and/or message communications.

**teleprocessing** - the processing of information that is received from or sent to remote locations by way of telecommunication lines; such systems are necessary to hook up remote terminals or connect geographically separated computers. See also telecommunications.

**terminal** - a user interface to the computer; it is generally equipped with a keyboard (or other input device) and an output device (e.g., display or printer) and is connected to a computer system.

**The Source** - a commercial information utility that provides a wide variety of information that can be accessed remotely.

**32-bit system** - refers to the number of 0s and 1s making up a word that can be processed, stored, and recalled at one time in a single machine cycle [see also 8-bit and 16-bit system].

**timesharing** - a computer shared by several simultaneous users for different applications.

**touch sensitive** - refers to the technology that enables a system to identify a point of contact on the screen by coordinates and transmit that information to a program.

**transfer rate** - the speed at which information can be sent across a bus or communications link.

**transmission** - sending information to one or more locations or recipients.

**transmission speed** - the rate at which information is passed through communications lines, generally measured in bits per second (bps).

**turnkey system** - a configuration in which the manufacturer takes full responsibility for complete configuration design and installation and supplies all necessary hardware, software, and documentation elements.

**TWX** - Teletypewrite Exchange Service; a domestic low-speed communications service provided by Western Union; now called Telex II.

## U

**Unix** - a multiuser operating system developed by Bell Laboratories.

**user** - generally a nontechnical person interacting with a computer.

**user group** - any organization made up of individuals requiring a particular hardware or software product; it is formed for the purpose of information exchange regarding that product in an operating environment.

**user program** - a computer applications software group of instructions written by an individual requiring the services of a computer.

## V

**value-added network** - communications pathway that provides enhanced services in addition to the communications channels.

**VAN** - see value-added network.

**video** - the information displayed on the screen of a CRT.

**volatile storage** - memory that loses its contents when electrical power is removed.

## W

**warm boot** - reloading the operating system and initializing the computer after it has been on without turning the computer off; contrast with cold boot. See also booting.

Winchester disk - a rigid, non-removable, magnetic oxide-coated, random access storage medium technology built as a sealed unit.

X

Xenix - a multiuser operating system developed by Microsoft, Inc; a subset of Unix. See also Unix.

xmodem - the most popular PC-to-PC error-checking protocol.

X-on/X-off - a method of controlling data communications; it essentially allows a terminal to activate a line when it is ready to receive information, and suspend line activity when the terminal is overloaded; see asynchronous.